GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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AN EXPLANATION.

It should be explained to our readers that this issue of the "JOURNAL" is being "made-up" for press on the usual day, but it cannot be machined and distributed until the printing trade returns to its normal state. Hence the disparity between its date and the time of reception. A similar procedure will be adopted for as many weeks as necessary (or possible), in order that the long continuity of the "JOURNAL'S" record may remain unbroken.

EDITORIAL NOTES.

A State of Emergency.

A STATE of emergency exists in the country. The subsidy came to an end on Friday night, as did the negotiations with the Miners' Federation. That alone was a serious matter, but worse was to follow next day, when the General Council of the Trade Union Congress resolved upon a general strike on Monday midnight, unless there was a previous settlement with the miners. And this just at a time when the country was emerging from the depression which has been so long overhanging its industries and trade, and when unemployment was on the ebb. The decision of the Council of the Trade Union Congress was nothing less than a threat to inflict a crushing blow upon the community, and upon the general welfare of the country, because economic conditions had created a set of circumstances to the improvement of which the Miners' Federation refused to render temporary aid. As a matter of fact, it can hardly be said that the Federation have done anything in the way of real negotiation. As was mentioned last week, they came to a resolution on wages, hours, and minimum percentages. There they stuck; and what was termed "negotiation" was merely repeated rejection on their part of any proposals which touched wages or time. Throughout, too, they evaded any committing of themselves to the carrying-out of the report of the Royal Commission; and they did nothing whatever to try to develop peace, and provide for better times for their people by offering temporarily to make a sacrifice, and to assist in the reorganization of the industry. The stand was taken that an attack was being made upon the standard of living of the men; and much idle chatter was indulged in from this viewpoint. The truth is that no one is making an attack upon the standard of living. Only economic circumstances have made an attack; and no one can bring economic circumstances to book for such action. What has actually happened is that the present position has been brought about largely by the Miners' Federation having attacked the standard of output in relation to pay, with such result that the coal industry cannot effectively meet the competition which assails it; and therefore there has been a heavy shrinkage in the markets for coal. The conditions of our home industries, too, have helped to bring about further disablement. The Miners' Federation recognize none of these things as affecting their claims; the General Council of the Trades Union Congress have also apparently given them the go-by. On the other hand, in threatening the country with what it is hoped by them will be a crushing blow, they are doing something which has never been attempted before, and which, whatever the issue, will inevitably inflict injury upon employment and the standard of living of the workers.

Little use would now be served by surveying the course of the negotiations last week, and the offers that were made, in all which the Prime Minister took the hardest, most anxious, and indefatigable part. It must have required great courage for him to continue to the end when, at every turn, he found himself up against the blank wall created by the attitude of the Miners' Federation, who, so far as appeared on the surface, had done nothing to carry-out the injunction of the Council of the Trade Union Congress to explore all the suggestions in the report of the Royal Commission to ascertain precisely how far they affected the general situation, and to fine down the points of difference on all matters as between the owners and the miners. The subsidy, as things stand, represents a dead loss to the country, excepting that it helped to tide us through the winter, and leaves us at May 1 this year in a worse position than we should have been in at the end of July last year. Perhaps a little credit may also be given to the spending of the subsidy in that the Royal Commissioners' report points out ways in which the coal owners could have done more to reorganize the industry, and place it on a better basis. Reorganization, however, requires time; and it is this essential time that the Miners' Federation declined to recognize in conjunction with the demands which they preferred, and from no single point of which would they recede—no doubt being under the impression that the Government would yield on the question of subsidy, and extend it so as to relieve, as far as possible, the miners from the necessity of contributing anything to the improvement of the economic conditions of the industry. On top of a strike brought about because the Miners' Federation would concede nothing, and would give no help towards raising the industry to better state, there comes the news that the men of several other industries are to be called out, as though the coal trouble in itself was not sufficient force. However, at the time of writing, the country is taking the matter seriously, but not in any cowed fashion; being resolved to treat such tyranny in a fearless and spirited manner. It is a curious position when Trade Union leaders have the power to stop and dislocate the country's system by calling a general strike of all the vital services, because a Trade Federation make claims which an industry cannot fulfil from its own resources, refuse to assist the industry to better conditions, and expect other indus-

tries to be bled in order to maintain the one. Even should a settlement be quickly reached, we fear this action has done the Labour Party infinite harm in the country—the grave action of stopping the means of subsistence of millions of people in the country, and of shattering those means (if carried through to the end) for long to come. The irresponsibility and iniquity of the step need no emphasizing.

The strike programme issued by the General Council of the Trade Union Congress ordered that a general strike should begin, from midnight on Monday last unless the coal dispute was settled, of men—some 4,440,000—engaged in all forms of transport, printing trades, the iron and steel industries, metal and heavy chemicals group, and building trade, and that the trade unions connected with the supply of electricity and gas should co-operate with the object of ceasing to supply power. Light and heat are not mentioned. How there can be discrimination is not stated; how supplies for power can be stopped without depriving millions of people of the operative class of the means of cooking, was not indicated. But the Council have requested the Executives of the Trades Unions concerned to meet in order to formulate a common policy. The one redeeming feature of the programme is that the General Council recommended there should be no interference with health and food services. The Government were prepared with, and set to work at once, the machinery provided for meeting such emergencies. Directions were issued by the Board of Trade relating to the use of fuel—rationing supplies and restricting consumption to not more than 50 p.ct. of the average weekly quantity consumed in the four weeks preceding May. Provision is made, in cases where an industry or business cannot otherwise be carried on, for this restricted maximum to be exceeded for a limited period—this being subject to conditions which must be carefully scrutinized. New supplies cannot be acquired without the written consent of the local authority. Lights for display and advertisement are prohibited. In regard to gas and electricity, the notice stated :

> All possible economy in the use of gas and electricity must be effected. In order to assist in securing this end undertakings supplying gas may reduce the pressure at those times of the day when the demand is low in order to meet the demands when gas is most needed.
>
> Gas and electricity for industrial purposes are required to be restricted in the same manner as coal.
>
> Any contravention of the directions is an offence punishable on summary conviction by imprisonment or fine.

All this vividly reminds of war time. Fortunately, so far as coal is concerned, we believe the gas undertakings of the country generally have good stocks. It is their own fault if they have not.

Regarding the position of the London Gas Companies, it was announced on the morning of the national strike that the Gas Light and Coke Company "were standing by, and waiting and would carry on as far as possible as usual." The position with regard to their supplies of coal, it was added, was well known; and there would be no need for apprehension in that matter for some little time. Answering numerous inquiries, the Board of the South Metropolitan Gas Company assured their consumers that they need have no apprehension of any interruption in their supplies of gas. "They are served by a "loyal body of employees who have been working for "between 30 and 40 years under co-partnership con-"ditions of service. The great majority of them are "shareholders in the undertaking, in the managing of "which they have a voice through the three Directors "they elect to the Board of Management." The Commercial Gas Company stated that the supplies of coal in hand would enable them to carry on for a time.

A Gas Charter for Stability and Development.

It is an open secret that the National Gas Council have had under consideration, and are now preparing for, the promotion of new legislation for the purpose of bringing the financial powers of the gas industry into line with modern circumstances, and making better provision for the work of expansion, which, it is clear, lies before the industry. This is good; and when the complete information is available, we are confident that the industry generally will give full confirmation. In various editorial articles in the "Journal," covering some months, we have advocated (and have received generous endorsement from many parts of the industry) a looking-forward policy; and such a policy means that legislative action will be essential in the cause of development and stability —the latter being essential to the former. Some men, on superficial examination, may say that under our present powers there is good development of business, and that this shows stability. We have, as can be readily explained, to go deeper than that.

We think it will be agreed that a modification and extension of our General Acts is long overdue. Between those Acts, the Gas Regulation Act, modern Private Gas Acts, and the current operations of the industry, there is little in common. On those grounds alone, there is cause for modernization, and a greater cause exists in Time's mutations. Cause and opportunity combine. The Government have shown their desire to help industries to place themselves in better position to assist in national provision and development. We see the desire—the methods need not be discussed here—in what has been done in connection with the railway services, the proposals for the electricity industry, and the willingness of the Government to legislate for the development of the coal industry. We believe, however, the Government would far sooner see schemes for the purposes in view emanate from within an industry than that it should go jogging along in the old traditional way, and show little innate inventiveness in respect of its own necessities. In what is seen of parliamentary tendency and action, there is found an excellent opportunity for the gas industry putting forward certain claims which will assist development in public service, and provide the greater security and facilities that are required.

The popularity of gas or of any other commodity must have its limits under a set of inflexible conditions. The gas industry is handicapped in making progress at a greater rate by certain capital conditions, and by the vacillating circumstances of the secondary products markets. It desires to increase the attractions of its capital by altering the terms on which it is raised and subscribed, so giving to it greater stability and security, which will ensure the flow into the industry of new capital on conditions that are good for undertaking, investor, and consumer; thus enabling developments to the made by wiping-out uneconomical service, and by persevering with changes in system which will provide the most economical and efficient primary and secondary products. That is in the interests of the public. The Government are proposing to guarantee to the electricity industry £33,500,000 —perhaps much more will be needed. The Government are not suggesting the guaranteeing of an equal number of millions for the competing gas industry, which is also engaged in a large—and much larger—service to the community. Therefore, there is good reason for the Government looking with friendly eye upon proposals which will in some measure provide compensation, without involving them in liability. We have seen the market value of gas stocks shrink considerably since the Government electrical proposals were announced; but we will not suggest that the whole of the depression which market values have suffered is due to that cause. The war has left a feeling of insecurity, due to the revealed defect of a bottomless sliding-scale, which allowed dividends to drop almost out of sight; and to-day even dividends at pre-war rates have not pre-war value, and are subject to an income-tax between three and four times greater. Though that is the position, and cheap capital is required for developments, there is the further consideration that the installation of new plant and the replacement of old plant by that which is more efficient can only be done at an increased cost compared with pre-war days—and that with dearer capital.

Hence before long we shall be hearing from the National Gas Council of their proposals for seeking an amendment of legislation to effect the removal of financial disabilities and obtaining increased financial powers. The first thing that has to be done—this is imperative—is to give investors confidence in the sliding-scale. In this regard, experience of the working of the Gas Regulation Act has shown us that there is no provision in it to ensure the

protection of the fundamental principle of the sliding-scale, which was intended to be an incentive to good administration and a deterrent to bad management. It is necessary that that principle should still be observed in the operation of section 1 of the 1920 Act. The next thing is to prevent, in the case of emergencies or extraordinarily bad times, the disappearance of dividends on ordinary capital. This can be done by providing for a minimum dividend. There is precedent for this in the gas industry; and provision of like kind has been made in the application of the sliding-scale to electricity undertakings. Then the way should be eased for the raising of capital by all statutory gas undertakings, through authorization from the Board of Trade, without having to engage in the costly procedure of applying to Parliament; and a revision of borrowing powers is also desirable. These changes are essential if a policy of economic development is to be pursued by the industry.

As our previous articles have indicated, there is plenty of scope for a new General Gas Act, not only in respect of capital powers, but other matters. We know that the National Gas Council have a Committee, assisted by accountancy experts, who are investigating the question of introducing greater elasticity into the powers of charge by the industry. We believe there is a good tendency on the Council favourable to the application for powers to facilitate the introduction of the system of a two or three part tariff. This is a matter which has been frequently discussed in the "JOURNAL." In this, as the electricity industry has found, a fixed charge and a low charge per therm or unit must encourage the consumption, which automatically, the larger it becomes, reduces the average cost of the therm or unit to the consumer. That is a system which is particularly applicable to the development of the use of gas for heating; and a Government who are proposing to legislate for smoke abatement must countenance any scheme which will assist in that desirable reformation. Where such a system is adopted, the Board of Trade would be empowered to make the requisite modifications in the sliding-scale.

Then there is that large question of development, to raise the standard of efficiency and economy throughout the gas industry, by providing for amalgamation, co-operation, and joint working of gas undertakings. The advantages to the public have been proved by what has already been done. The National Gas Council, we believe, are proposing to incorporate such matters as these in their legislative schemes for the development of the industry; and we feel sure that such action will also be generally approved. The line they will probably take will be to seek for the simplification of the means of securing authorization, through the investing of the Board of Trade with the necessary powers. It is likely, too, that they will suggest not only powers of amalgamation, co-operation, and so forth, but authorization, where it is advisable, to establish Joint Boards or Joint Committees, which would enable co-operative work even between municipal and company concerns, and the provision by the Joint Board or Committee of central gas-producing stations. There is a vast field for developing joint operation with all the economies that can be produced by such a course. The financial and economic ramifications of this particular question are great; but the policy is consistent not only with the Government electricity scheme, but the views of the Royal Coal Commission.

There are a number of miscellaneous matters before the Central Executive Board which could also be incorporated in a new Bill, the granting of powers for which can be fully justified, as being more or less auxiliary to the main proposals for future development and stability. These minor questions are being thoroughly probed and investigated; and about them and the whole subject more will be heard before very long.

Of this we are sure that, whatever plans the Central Executive Board of the Council produce—there is diligent working upon them to-day, and the broad outlines are far advanced—for facilitating the development of the industry on terms which will give it a proper measure of equality with the electricity industry (which is receiving unprecedented support from the Government), the whole gas industry will give to them unstinted backing. The industry is, through its experiences, content to operate through the Board of Trade; but the Board are at present limited in their powers by the Gas Regulation Act. In new general legislation, this can be rectified. On behalf of the Government, it has been stated that, in their plans for the development of the electricity industry, there is no intention to do anything harmful to the gas industry. The greatest harm that could be done to the industry would be to withhold from it powers which are necessary to its development and progress in the service of the country. It is to secure those powers that the National Gas Council are working. A new spirit obtains in the gas industry to-day regarding the ways and means to future progress and development.

Electricity Bill in Committee.

THE Standing Committee on the Government Electricity Bill had two sittings last week—on Tuesday and Thursday—and made little progress, though a satisfactory modification was conceded through pressure, and exposure of the ridiculous position which the crude measure proposed to create. At the outset, the Attorney-General (Sir Douglas Hogg) made it clear that the Government did not intend to allow any remodelling of this or that, which was another way of saying that the Government proposed to utilize their power to curb the judicial functions of the Committee to whom the Bill had been referred for the specific purpose of moulding it as the members, in their wisdom, saw fit. But by the second sitting, the Government had relented; hence the modification. Sir Joseph Nall's criticism of the proposed relationship of the Central Board and the Electricity Commissioners was framed so as to show well its naked absurdity. Briefly put, the Central Board were, under the Bill as drafted, to frame a scheme in consultation with the Electricity Commissioners. Appeal against any decision of the latter was to be made to the Ministry of Transport; and the expert advisers to the Ministry were the Commissioners. The position resolved itself into this: The Central Board, not being a technical body, must go to the Commissioners to help to draw-up a scheme. The Board, not understanding the scheme, would then hand it back to the Commissioners for their approval. Any objectors were then to have an opportunity of being heard. By whom? The Commissioners! This is the serious proposal which was to give statutory effect to a Gilbertian situation. There would have been no protection in it for the public and the electricity industry, and, as was pointed out, it reduced parliamentary control of governmental legislation to a pure farce.

The attack was continued on Thursday; but, before the discussion ended, Colonel Wilfrid Ashley, the Minister of Transport, made announcement of the important concession to which reference has already been made. It is that the Electricity Commissioners are to prepare the scheme, and present it to the Board, who would then consider it, and receive representations from those who believe they are adversely affected by it: and those who think they are financially wronged by it will have the right to make appeal to an independent tribunal. Now the Commissioners will, in effect, be the technical advisers to the Board. This change of position is more in consonance with the views of the gas industry. It also appears from a statement by the Attorney-General that one or two members of Parliament may be nominated for seats on the Board, the nominations for membership of which will be in the hands of the Ministry of Transport, and their salaries will also be fixed by him. Colonel Ashley will secure many friends until the snug post or posts are filled. The electricity industry is wondering when the official clothing that is being made for it will come to an end, and what will be its cost.

Power of the Electricity Commissioners.

IT has become somewhat notorious that there are electricity undertakings which make—if they do not always succeed in the essay—what, in our opinion, is unjustifiable application for Government grants of money for carrying out work on the specious ground that it is for the relief of unemployment, while actually the expenditure is for ordinary developments, replacements, and so forth. Being purely normal outlay, which would be incurred whether or not there was unemployment, no part of the

country's funds ought to be used for such purpose. The point, in our judgment, was well illustrated by Hastings in our "Electricity Supply Memoranda" for April 21. Work in connection with the change of frequency is proceeding there which will cost some £18,000. The Corporation Electricity Committee recommended the Council to apply to the Electricity Commissioners for sanction to the borrowing of the estimated sum required, and "for a grant towards such cost." Can anyone say why the Hastings electricity undertaking should be favoured in that way, as compared with any other trading concern? If a grant is refused, the work will go on just the same; and it is a fair charge upon the undertaking. Then, in respect of another and larger capital expenditure, Hastings proposes to go cap in hand to the Unemployment Grants Committee for a grant towards the cost on the ground that it is a scheme "for the relief of unemployment." It is nothing of the kind. It is part of the normal work associated with the extension of the area of electricity supply from the Corporation generating station. This particular outlay is for the provision of (1) high-tension lines and cables, and (2) high-tension and low-tension underground cables, transformers, &c., which are needed for the distribution of the current in the outer areas. The estimated amounts of the respective contracts are: £26,554, *plus* an added 20 p.ct. in respect of contingencies; and £24,658, *plus* an added 10 p.ct. for contingencies. The total estimated cost is £68,707, for which application is to be made to the Electricity Commissioners, with a petition (as already intimated) to the Unemployment Grants Committee for a contribution towards the outlay. Naturally, all additional work creates labour, and so helps to relieve unemployment; but this is not work that has been specially put in hand for that beneficent object. It is purely reproductive work (or it is hoped it will be) which is part of the development scheme of a trading concern; and if a grant for any one of these purposes is made, then taxpayers, wherever situated, would have just cause for complaint. We understand that some time ago the Unemployment Grants Committee were instructed not to allow grants for work that would be executed in ordinary course, and that all applications should be narrowly scrutinized with this in view. We suggest to the Committee that some of the applications from electricity undertakings should be the subject of close examination before adopting a benevolent attitude towards them.

The Hastings case suggests another matter. So far as we are aware, the Order to sanction this work had not been approved by the Electricity Commissioners, and statutory confirmation obtained for it, when the Town Council were considering the schemes and their financial commitments. If this is correct, it shows a remarkable confidence on the part of the Council, and a somewhat strange position of affairs, that the Corporation should be able to negotiate and enter into provisional contracts in anticipation of definite authorization. We are not surprised that members of the House of Lords and of the House of Commons are beginning to awaken to the fact that the Electricity Commissioners have somehow managed to usurp the power of control which is the prerogative of Parliament. Let the gas industry mark well the position which has been created by the increments of power the Electricity Commissioners have been able to obtain. First of all, they can suggest or approve of a grandiose electrical station and scheme; then they can grant loans for the station without inquiry; but if objections to (say) an extension of area are submitted to the recognized way, it is one of the members of the Commission who holds an inquiry, and the Commissioners themselves (who have previously approved the scheme) are the judges. Then assuming they swallow the extraordinary statements and estimates placed before them by the promoters in support of the extension, they can grant (again without inquiry) the expenditure on the necessary mains. In this respect, the Electricity Commissioners are an asset of no mean value to the electricity industry. It certainly says something for their ingenuity that they have been able gradually to work their way to this altitude of power; but is it to be marvelled at that, on various occasions recently, there have been indications in Parliament of a growing feeling that that august assembly is losing its grip over the granting of powers to the electricity industry—that the power has been allowed to drift away to a few paid officials who are not elected by the body politic? The system is one which can be very injurious to another industry; and it has been found to be so by the gas industry—not only through the ease with which electricity undertakings can have their desires gratified through the Commissioners, but through that body very frankly showing an unflinching resolve to keep the gas industry well at arm's length from the industry under their guardianship. The gas industry must see to it that, by representation and every other means open to it, there is action directed to getting this state of things corrected. If it is not to the interest of the country that its public utilities shall be conducted in watertight compartments, and with such absolutism, then this sort of thing must not be permitted to continue.

But the incremental growth of power brought about by the Electricity Commissioners, instead of being simply partial and valuable to the electricity industry, is now in a fair way to becoming autocratic, burdensome, and distasteful, as is seen by the Government Bill now under discussion by a Standing Committee. The scheme of the measure, unless drastically modified, will raise the Commissioners to a high pinnacle of dictatorial authority over the whole of the electricity industry. Only people short of intelligence will hold the contrary. The electricity industry sees the red light; and it has been working hard to escape from the uncomfortable situation which it is proposed—probably through the designs of the Commissioners—to impose upon it. The position is not liked; and the degree of resentment is reflected in the pages of amendments which are being introduced to the Standing Committee. But from what is said in the earlier part of this article, it is not only the position to be created by the Bill before Parliament which concerns the gas industry, but the power, and the exercise of it, already possessed by the Commissioners, with no superior control—or, perhaps it would be better to say, with no satisfactory superior control. To-day the Commissioners call the tune; Parliament dances to it. Happy Commissioners! But what is to be said of Parliament?

Gas Fund.

The Board of Trade have announced that the rate of contribution to the Gas Fund for the current year will be 1s. 1d. per million c.ft. of gas sold during last year. This is a reduction of 2d. per million c.ft. upon the rate in force in 1925.

Road Tar.

There is great activity in connection with road tar. The Joint Consultative Committee consisting of the tar interests and borough and county surveyors have held more than one meeting, at which some extremely interesting points have been raised. These points will be directional in assisting to development which will enable tar producers and distillers to shape their operations so as to give complete satisfaction to those who are officially responsible for the making and upkeep of our roadways. As a result of these meetings, it has been reported to the Joint Tar Committee of the British Road Tar Association that individual members of the Committee are working in the direction of meeting the special requirements of their county surveyors. We have not formerly placed on record, but should like to do so in this connection, that, at an informal meeting of the Institution of Civil Engineers early in March, Sir Henry Maybury supported the submissions of the Joint Tar Committee's representative that tar macadam is used extensively throughout the country with very satisfactory results, and Worcestershire was instanced as possessing some of the best roads possible. Sir Henry also mentioned that over a million tons of tar macadam are used annually for road construction purposes; and he said he would not like it to go forth from such a meeting that tar macadam had no place in the road schemes of to-day. The utility of tar macadam is highly important.

Road Fund and Commercial Vehicles.

There was nothing of a surprising nature in the Budget of the Chancellor of the Exchequer which was submitted to the

House on Monday of last week. In no respect is there a remission of taxation such as our industries and commerce much desire and deserve. The only two new points in which our readers are specially interested are the decisions regarding the Road Fund and increased taxation on commercial road vehicles. Regarding the first, from the present Road Fund reserve a sum of £7,000,000 is to be transferred to the Exchequer; and all the revenue from motor-car taxation is in future to be divided between the Road Fund and the Exchequer—the latter taking one-third of the yield from private motor cars and motor cycles. The whole yield from commercial motors and hackney traffic is to go to the Road Fund. The amount which is provided for road purposes during the coming year is £21,000,000, of which rural roads are to receive an additional £500,000. Regarding the additional duties on commercial road vehicles, these are expected to raise £1,500,000 during the current financial year, and £2,345,000 in a full year. Goods vehicles it is stated will bring in most of the extra revenue—£1,200,000 this year, and £1,800,000 in a full year. It may be mentioned that among other decisions the key industry duty is to be continued for ten years; but regarding the Trade Facilities Act, this is not to be renewed next year.

Smoke Abatement Bill.

We see that the Central Executive Board of the National Gas Council describe the new Smoke Abatement Bill as "by no means a stringent measure." That verdict is quite consistent with the opinion of most men who have made a study of the smoke nuisance in relation to both industrial and domestic contribution. It has been considered that the Council should take up the same attitude as was adopted towards the previous Bills introduced since 1921, when the report of Lord Newton's Committee was issued—that is, to press for amendments giving, at any rate, power to local authorities to make by-laws relating to the emission of smoke from private dwellings. The Coal Smoke Abatement Society, it is understood, are framing amendments to the measure so as to include domestic smoke. In this matter, the Central Board are keeping themselves in close touch with the Society and the Smoke Abatement League at Manchester.

Rating of Machinery Committee.

It is unfortunate that Government Departments do not appear to exercise a fair discrimination in the appointment of their Committees. As previously said in the "JOURNAL," the gas industry is deeply concerned in the question of the rating of machinery; and it does appear to be unreasonable that, of a Committee of five appointed by the Minister of Health to prepare a statement in accordance with the provisions of section 24 of the Rating and Valuation Act, 1925, there should be two of the members who are prominently identified with the electricity industry, but not a single representative of the gas industry. The statement which the Committee have to prepare will set out in detail all machinery and plant which appears to them to fall within any of the classes specified in the third schedule to the Act, and in this work a professional member of the industry could have been very helpful. Regarding representation of the gas industry, the Central Executive Board of the National Gas Council communicated with the Ministry of Health; but, as stated in a previous issue, the Ministry replied that they were unable to accede to the request, owing to the statutory number of members having been appointed. The National Gas Council have again written to the Ministry of Health expressing regret at the decision not to allow the gas industry to be represented on the Committee.

PERSONAL.

On April 30 Mr. ERNEST L. BURTON, F.S.A.A., ceased to hold the position of Secretary of the Brighton and Hove General Gas Company, having been appointed by the Board to be a Director, in the place of the late Mr. P. W. Colley.

Mr. J. H. WAINWRIGHT, who was a pupil of Mr. W. Prince, of Tipton, and subsequently his assistant, has been appointed Manager to the Halesowen Gas Company, and will take up his duties on July 1.

We congratulate Mr. HYDE CLARK BURTON, A.C.A., on his appointment as Secretary of the Brighton and Hove General Gas Company.

OBITUARY.

Mr. PHILIP THOMAS, Manager and Secretary of the Wellington (Somerset) Gas Company, died recently at his son's residence at Burnham-on-Sea. Deceased, who had been an official of the Company for many years, was a man possessed of keen business gifts, and took a deep interest in public affairs.

"EVENING STAR" GOLF SOCIETY.

Last Thursday a meeting of the above Society was held at the Hadley Wood Golf Club. Many members had looked forward to renewing their acquaintance with this charming course, which last week offered perfect greens and a fairway which had not altogether succumbed to the recent bad weather. The latter, as it happened, relented for the day, and it was a pity that the sun had not a larger attendance to shine upon—only twelve members found it possible to enjoy the day's golf. Urgent business and sickness were responsible for several absentees, among whom was Bro. Stephen Hay, claimed by influenza. This was particularly unfortunate, as he was unable to defend his holding of the Davis Challenge Cup.

The latter was played for in the morning Medal Round, and was won by Bro. T. Carmichael with the steadiest golf imaginable and a net score of 79. Bros. E. J. Fussell and E. J. Davison were bracketted second with a net score of 81.

In the afternoon, Medal Foursomes were played under half combined handicaps, and were won by Bros. T. Carmichael and Clifford King, with a net score of 78. W. Bro. Packham and Bro. Silk were second with a net score of 84½. The winners were presented by the Society with engraved spoons.

It was a most enjoyable meeting, and W. Bro. Henry receives the thanks of all for his organizing work.

Meetings Postponed.

Several meetings were postponed on account of the strike. See "Forthcoming Engagements" in next column.

FORTHCOMING ENGAGEMENTS.

[Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.]

May 5.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual general meeting postponed.
May 6.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring meeting postponed.
May 6.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Spring meeting postponed.
May 6-7.—REFRACTORY MATERIALS SECTION OF THE CERAMIC SOCIETY.—Meeting at Newquay postponed
May 6-7.—IRON AND STEEL INSTITUTE.—Annual meeting at Institution of Civil Engineers.
May 7.—NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.—Annual general meeting postponed.
May 7.—CHEMICAL ENGINEERING GROUP OF THE SOCIETY OF CHEMICAL INDUSTRY.—Annual general meeting at the Florence Restaurant, Rupert Street, W. 1, at 6.30.
May 7.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Annual general meeting at the Westminster Technical Institute, postponed.
May 8.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Visit to the Blackburn Gas-Works.
May 11.—FEDERATION OF GAS EMPLOYERS.—Meeting.
May 11.—NATIONAL GAS COUNCIL.—Meeting.
May 13.—MURDOCH LODGE, No. 3480.—Meeting.
May 13.—FARADAY SOCIETY.—General discussion on explosive reactions in gaseous media, at the Institution of Mechanical Engineers, postponed.
May 14.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Meeting postponed.
May 14.—"B.C.G.A.," MANCHESTER DISTRICT CONFERENCE.—Buxton. (Postponed.)
May 18.—"B.C.G.A.," CHESHIRE AND NORTH WALES DISTRICT CONFERENCE.—Wallasey. (Postponed.)
June 1.—NATIONAL GAS COUNCIL.—Annual general meeting.
July 19.—INSTITUTION OF CHEMICAL ENGINEERS.—Annual meeting.
Sept. 9.—"B.C.G.A.," MIDLANDS DISTRICT CONFERENCE.—Smethwick.

INSTITUTION OF GAS ENGINEERS.

May 10.—Benevolent Fund, Finance Committee.
May 11.—Advisory Committee on Education, Emergency Committee.
May 19.—Gas Investigation Committee.
June 7.—Council.
June 8-10.—Annual Meeting.
June 11.—Visit to Hastings.

ELECTRICITY SUPPLY MEMORANDA.

Discussion of the Electricity Bill by the Standing Committee started on Tuesday of last week. The object of this species of parliamentary committee is to relieve the House of detail work in connection with a Bill, by discussing and adopting such modifications as are necessary for the objects in view, and for making the measure a workable statutory instrument. But in connection with the present Bill the Government have formed a resolute intention of not allowing any change to be made of which they do not approve—in other words, the Standing Committee are not to have any judicial power, but everything is still to be subject to the will of the Government. The Attorney-General made this clear in his opening statement, when he announced that the Government would not accept a number of the amendments which had been put upon the notice paper. If the Government are going to take up an attitude of that kind, then it belittles the value of Standing Committees. On the first day, the Committee did not succeed in disposing of Clause 1 before adjourning until Thursday. It looks as though dealing with the measure is going to be slow and tedious work; and the Government may fairly anticipate criticism in another place if they wield their big club too severely to frustrate the reshaping of the Bill, so as to meet with the views—not of the Electricity Commissioners and the Government, but of the industry whose duty and responsibility it is to carry on the supply of electricity in this country. An important concession was made by the Government on Thursday, which ruled out some of the opposition. It places upon the Electricity Commissioners the duty of preparing a scheme and submitting it to the Central Board. This reverses the positions of the two bodies. Comment on the proceedings in Committee is made in an earlier column.

The Bill.

A New Cooking System.

When what the electrical people term "improvements" are made in electricity consuming apparatus, it is usually found that the so-called advance has been effected by increased complication and higher initial and maintenance costs; and, of course, the greater the complication, the greater the number of seats of likely mishap. The electricity industry recently had brought to its notice a new method of cooking. It is offered for consideration by the Falkirk Iron Company, Ltd.; and the inventor is Mr. C. H. Louth. The principle on which the system works is induced electric currents; and the chief claim for it is that it represents a big advance in thermal and time efficiency for all cooking. The lukewarm reception it has had does not suggest any lively anticipations of big things from it. We have not seen the apparatus, and therefore must rely on the descriptions which have appeared in our electrical contemporaries. The "Electrical Review" describes the new method as follows:

> The feature of the equipment is a transformer or inducer, the core of which is built up of laminated plates. A portion of the core is removable, thus breaking the magnetic circuit; this being necessary to link the cooking utensil or secondary circuit. For this purpose the foot of the utensil is arranged as a loop or one-turn coil of heavy nickelled copper—specially constructed utensils being necessary. The primary coils are securely fitted in place, are of enamelled copper strip, and are connected in series or parallel to the control switches according to the supply voltage and the heat required. In the case of single portable models, an outer casing and cover conceal and protect the primary circuit and main terminals, the casing being suitably earthed. The movable portion of the inducer, or keeper, is supported at the back on a standard with springs, which hold it above the transformer when the utensil is off, and allow it to close the core when the pan is on. A special automatic switch is fitted to prevent the keeper from being pulled down magnetically if the switch is closed when the vessel is off. The domestic oven employs induced current for roasting only; ordinary radiant-heat elements being used for other cooking. It is strongly constructed of steel and suitably lagged all round. The resistance elements are built in suitable frames, which can be placed at the top, sides, or bottom of the oven as required. The elements are wired for multi-heat regulation, and the cooking space may be limited by placing a horizontal element-containing shelf at any required height in the oven. The induced current for roasting is conveyed to and from the joint by special contacts; a steel plate laid in the bottom of the meat pan, and on which the meat rests, forms one of these, and a chain mesh which is laid over the meat forms the other. It is necessary to have lean cuts on the meat for both the top and bottom contact. [Cooks will be charmed with all this harnessing of joints.] The inducer for roasting is placed externally to the oven; and the current is derived from a pair of coils wound so that, when the domestic inducer is being used for oven work, it practically becomes an auto-transformer. The keeper is pressed into position and the current switched on "high." A small lever is then raised, which acts as a switch for the oven coils, and also prevents a pan from being placed in position on the inducer. The oven is used in connection with a domestic suite consisting of one 3·7 kw. and two 2·75 kw. inducers, and the oven; the larger inducer being equipped for the oven cooking. For heavy appliances for use in restaurants, hotels, or ships, the boiling-tables would consist of heavy inducers, 15 kw., let in flush with the table and built up in batteries to suit requirements. Large boiling-pans of 20 to 25 gallons capacity, fish fryers, and water-boilers, are equipped with the 15-kw. units fixed permanently in the base of the apparatus. In the case of the water-boilers, part of the induced-current circuit is in the form of a tube, through which the water in the tank circulates.

This description of the new appliance and the process of operation does not suggest a likely popularity. Further information is given by "Electrical Industries." It says that "the electric inducer transforms the electric energy into heat in the walls of the pan itself; sometimes the heat appears directly in the food. When an inducer boiling pan is switched on, heat appears instantaneously in its bottom and sides. The pan is the only hot part; the cooker or inducer itself remaining cool. From this basic principle of instantaneous induction of heat in the walls of the cooking vessel spring the remarkable features of inducer cooking. Rapid heating, combined with economy of current; delicate, precise, and quick control of heat combined with simplicity of operation; elimination of heating elements, with their limited life."

Efficiencies and Criticism.

The higher thermal efficiency claimed is, we imagine, traceable entirely to the rapidity of operation; but information is somewhat vague on the point. According to "Electrical Industries," "the domestic inducer has an efficiency of 85 to 92 p.ct. It will bring cold water to the boil at the rate of 1 pint per minute. To raise 16 pints of cold water to the boil requires 1 unit of electricity. It will simmer a pan for eight hours on 1 unit. . . . A batch of small cakes can be placed in a cold inducer oven, and be finished in 10 or 15 minutes. The oven will roast a 16-lb. joint in 30 to 40 minutes, from the time of switching-on, for one-third the current consumption of an ordinary electric oven, and preserving the juices and flavour of the meat to an extent hitherto unobtainable." At present we shall be inclined to take some of this applause with a grain of salt. To deal with the last point first. To secure the rapidity of cooking claimed, very high temperatures must be applied to the meat. There cannot be time-saving without; and with rapid high-temperature cooking, away must go the old song, rendered in high-pitched tones by electrical men, regarding the small shrinkage of meat "cooked" the electrical way. Then about the point as to the economy in current which can be realized by the inducer system, it will be seen above that, to bring 16 pints of cold water to boiling-point, requires 1 unit of electricity. Previous to that an efficiency of 85 to 92 p.ct. is spoken of. This does the 16 pints and the unit an injustice. Assuming an inlet temperature for the water of 48°, an efficiency of 96·13 p.ct. is realized, with a loss of only 3·87 p.ct. Our contemporary will forgive us if we entertain the idea that it has itself an abnormal absorption capacity. A little more, and the efficiency would have been over 100 p.ct. Then it is observed that specially constructed pans are necessary; and it is stated in one quarter that these have a long life. How this is known at this early stage is not exactly obvious. The "Electrical Times" speaks of the merits to which we have referred, and also mentions that, when the inducer is in use, there is an audible transformer hum, and a chattering of the utensil, particularly if the lid is a loose fit. But our friends must not be downhearted about this. The "hum" and the "chattering" may by further invention be converted into beautiful melody. It is also found that rather more care is necessary when handling these special utensils, seeing that they are raised some 3 in. or so above the table surface, due to the addition of supporting brackets or legs which link the copper bar of the secondary coil with the bottom of the utensil. Trouble may occur through over-turning. The price, too, is considerably in excess of that of alternative electric apparatus, which is a considerable disadvantage, as supply undertakings have found that the price of present appliances is not a favourable item in development. The load factor is also uninviting to the station engineer; and it is thought, if the loading of the large domestic inducer was brought down from 3·7 to 1·9 kw., so halving the speed, it would still be superior to alternative apparatus. These points do not inspire hope of the new system being superior in acceptance to existing appliances. It is, however, interesting in that it shows that research is being made to find out new ways of applying electrical energy to achieve old purposes.

Mixed Optimism.

At the last Electrical Development Association Conference for the session, Mr. J. J. McKenna, of the Cosmos Lamp Company, dilated on the progress and prospects of commercial electric cookery. He was optimistic, but at the same time he spoke fairly (so far as the reports before us show) in his comparative references to gas and electricity, and to essentials in connection with large-scale electric cookery. By way of opening, he asserted that the success of the domestic cooker has been phenomenal during the last few years. The meaning

attached to "phenomenal" in this connection is probably not the one we should give to it from the point of view of the gas industry. In this progress he thinks the following factors have had good part: (1) The hiring-out system; (2) low cost of current; (3) improvements in design to meet the requirements of the modern house; and (4) the ever-increasing reliability of the heating elements, which is qualified by what he says later in an allusion to maintenance. In regard to cooking on the commercial scale, he says that, though this has not been so rapid, it is nevertheless satisfactory. Excellent service, he states, is being given by existing equipments, and is proving effectively that electric cooking is not the bogey it was said to be in respect of high cost and unreliability. There may have been element failures in the early stages; but the number of these is decreasing through improvement in design. It is Mr. McKenna's belief that a quick approach is being made to the electrically much-desired stage when the failure of heating elements, even those used in conjunction with the boiling of liquids, will be a rare occurrence. It is pointed out, however, that the conditions governing the installation and use of a commercial kitchen equipment are not so favourable as those appertaining to the domestic cooker. The latter has the hiring scheme to further its progress; the commercial equipment has more often to be purchased outright. Further, its operation is in the hands of a paid staff, and, therefore, there is bound to be more waste, more misuse, and more abuse in its operation than in the case of the vast majority of domestic cookers. It is evident that the author of the paper, optimistic on the one hand, has, on the other, a very poor opinion of those who are placed in charge of such equipments.

Advice.

Mr. McKenna advises that future developments should be carefully considered, and not be pushed haphazard in every and any direction without reference to the suitability of the circumstances. "Much harm can be done by pushing electric cooking in a district or in circumstances where the conditions are against smooth and economic working"—for example, where the charge is on the high side, which he explains to mean 1½d. or over, unless the cost of gas is correspondingly high. The 1½d. is interesting, for the author says that, if an equipment is installed in such a district, the cost of cooking is "bound to be high," and where this occurs the equipment is blamed, and not the high rate at which energy is being supplied. In view of this, he urges the importance of the comparative costs of gas and electricity being carefully considered on receipt of an inquiry. In his opinion, the cost of current should not exceed 1d. per unit, where the competition with gas is keen, and should be in most cases in the region of ¾d. per unit, for there is, and always will be, a great deal of waste in a large kitchen. Equally important to cost is the question of supplying the right type and size of apparatus. If the capacity of the equipment is over-estimated, it may be taken for granted that every bit of it will be used daily with resulting inefficiency and high costs. Sometimes inquiries are received, with a schedule of sizes of ovens, boiling tables, grills, &c., based on the sizes of an obsolete gas or coal equipment. This, Mr. McKenna says, is misleading, owing to the fact that the cubic capacity of a gas-oven for a given output is often at least 25 p.ct. greater than the cubic capacity required in an electric-oven to do the same work. The reason he gives for this is that a good deal of space in a gas-oven must be kept clear at the bottom to prevent scorching the food. From this it is clear that Mr. McKenna has not yet had an introduction to the modern forms of gas-oven, and apparently he has not seen the enclosed type of oven which has been on the market now for a great number of years.

Maintenance and Operation.

It seems that, apart from cost of energy, there are two main criticisms levelled against commercial electric cookery which affect the apparatus—viz., high maintenance costs, and slowness in operation. Mr. McKenna frankly confesses that maintenance costs to-day are too high, and that they must be reduced very considerably if the experience is to be realized of a really big increase in the sale of commercial electric cooking apparatus. The maintenance costs of a kitchen equipment, he says, can be traced almost entirely to the failure of the heating elements used in the boiling of liquids, which elements are also accountable for the majority of complaints regarding the slowness in operation of electric cooking apparatus. It is on the boiling-plate that the bulk of the failures and breakdowns occurs, amounting to more than 85 p.ct. of the maintenance charges on the whole of the equipment. Therefore, the manufacturer is faced with the problem of producing a really quick operating and efficient boiling-plate of limited dimensions, containing a practically indestructible element. This has been a problem for many years past; but, in attempting to improve reliability and efficiency, there has always been loss in respect of the speed of operation. In this relation, we are afraid that Mr. McKenna merely accentuated information which is well-known to both electric and gas salesmen.

NATIONAL GAS COUNCIL.

District Executive Board Meeting.

SOUTH-WESTERN AREA.

The Annual Meeting was held at the offices of the Exeter Gas Light and Coke Company on April 22—Mr. G. HARDY HARRIS (Exeter) in the chair.

The minutes of the last annual meeting, dated April 30, 1925, were read and confirmed.

The CHAIRMAN read, and moved the adoption of, the report of the Management Committee for the year ended March 31 last. Mr. P. S. HOYTE seconded, and the report was adopted.

The list of elected members for the district was received.

Mr. J. E. NORMAN proposed, and Mr. P. S. HOYTE seconded, that Mr. G. Hardy Harris be re-elected Chairman of the District Executive Board for the ensuing year.

The resolution was carried unanimously.

On the motion of Mr. G. HARDY HARRIS, seconded by Mr. R. BRUFORD, Mr. P. S. Hoyte (Plymouth) was unanimously re-elected Vice-Chairman.

The following were elected on the Management Committee: Messrs. J. Armstrong (Ilfracombe), R. Bruford (Taunton), J. H. Cornish (Bridgwater), C. G. Dawson (Torquay and Paignton), W. E. Dean (Exmouth), S. E. Halliwell (Bristol), S. J. Ingram (Truro), J. E. Norman (Weston-super-Mare), W. N. Westlake (Exeter), J. W. Whimster (Bath), and T. H. Woodcock (Stroud).

Mr. G. HARDY HARRIS proposed, and Mr. R. BRUFORD seconded, that Mr. S. E. Halliwell (Bristol), who retires in rotation and is eligible for re-election, be re-elected one of the representatives on the Central Executive Board. This was carried unanimously.

On the motion of Mr. S. J. INGRAM, seconded by Mr. C. G. DAWSON, it was unanimously resolved that Mr. E. H. Dart be re-elected Hon. Secretary for the ensuing year.

DANGERS OF PULVERIZED FUEL.

It is clear from a report by the United States Bureau of Mines that the explosion risks of pulverized fuel are anything but negligible. Where fires and explosions have occurred which have killed workers and damaged property, the Bureau has availed itself of the opportunity to study the conditions under which the disasters have occurred. According to their report, pulverized coal only becomes dangerous when stirred up into a cloud with the proper proportion of air, and is brought into contact with an open flame, or a body having a temperature high enough to ignite it. Suggestions are made for the reduction of such dangers; among them being absolute cleanliness, and freedom from any accumulations of dust, both in the pulverizing plant and in the buildings in which the fuel is used. Dust on the floor or machinery should not be swept up without being wetted or thoroughly mixed with an excess of fine incombustible material. Adequate ventilation and cleaning by vacuum are recommended; also that open lights round coal-pulverizing plants should be prohibited, and no smoking be allowed in the building. A fireproof partition should separate the drier and drying furnaces from the pulverizing mills, conveying machinery, and storage bins. Special care should be taken not to overheat the coal in the drier; and recording pyrometers should be installed. Fire in the drier furnaces should never be started with paper, shavings, or any light combustible material. Owing to the liability of spontaneous combustion, dried or pulverized coal at a temperature of over 150° Fahr. should never be stored in a bin for over eighteen hours. Storage bins should, if possible, be emptied if the plant is to be shut down for a few days. Electric wires and cables should be enclosed in conduits, and switches should be placed outside the pulverizing plant or in dust-proof casings. In all rapidly moving machinery, there should be protection by thorough earthing against sparks from static electricity. No accumulation of dust should be allowed upon electric light bulbs; and the bulbs of all portable lights should be protected by substantial wire guards. Care should be taken to prevent arcing from loose socket connections or imperfectly insulated cords. It is clear from this report that against the risks of pulverized fuel very rigorous precautions are essential.

Coke for Replacing Anthracite.—From the "Iron and Coal Trades Review" it is learned that the Royal Commission appointed by the Government of Nova Scotia to report upon the conditions affecting the coal-mining industry in that Province support the suggestion that the Dominion Government should take steps to ensure the establishment of coke-making plants at suitable points. The availability of anthracite from the United States for domestic purposes limits considerably the possibilities of the sale of Nova Scotian coal in St. Lawrence markets for household requirements. The Ontario and Quebec consumption of domestic fuel alone is 4,000,000 tons per annum.

"B.C.G.A." CONFERENCE AT PERTH.

[Under the auspices of the British Commercial Gas Association, a successful conference was held in the Station Hotel, Perth, on Friday afternoon, April 30, at the close of the luncheon which was given by the Perth Gas Corporation to mark the inauguration of the extended works at Friarton.]

Bailie Stewart (the Convener of the Perth Gas Committee) occupied the chair; and he was supported by Lord Provost Dempster (Perth), Mr. J. Jamieson (Assistant Gas Manager, Edinburgh), and Mr. W. M. Mason (Manager of the British Commercial Gas Association).

The Chairman briefly introduced Mr. Jamieson, who then read the following paper:

GIVING THE PUBLIC A SQUARE DEAL.

By J. Jamieson, of Edinburgh.

[Extracted.]

It is generally agreed that the health and wealth of the British people depend largely on the methods adopted for utilizing our coal resources. Periods of disturbance among the miners have provided us with facts and figures from the health point of view; and most people will recall the wonderfully clear and fresh atmospheric conditions prevailing during the long coal strike—the entire freedom from smoke and the long distances which could be seen with the naked eye. These signs and results should encourage our industry to exert every effort to promote the greater use of gas for domestic and industrial use, and to bring forward prominently the benefits to be derived from the use of coke as a solid fuel in preference to raw coal. The coal consumed in its raw state in this country in 1924 amounted to over 147 million tons, and the coal treated in the production of gas and coke to 37 million tons. About four times as much coal, therefore, is still burnt in this country in its raw state—under boilers, in industrial furnaces, or in domestic grates and ranges—as is carbonized before being utilized.

The Smoke Abatement Bill now before the House of Lords is in my opinion a feeble effort to deal with this important matter. What is the use of Royal Commissions and Departmental Committees making recommendations, if these are not to receive ample consideration, and form the basis of new legislation? These recommendations are brought forward in an unbiased way, and why the Government do not act it is difficult to say. The only alternative I can suggest is that local authorities should bring pressure to bear on the Government in the interests of economy and public health. It is apparent that almost everyone, except our politicians, is convinced that the use of raw coal is a criminal waste; and it is hoped the public will demand legislation prohibiting the continuance of this practice.

We must therefore examine the alternatives for the provision of light, power, and heat. Two methods have been suggested—(1) The generation and distribution of electricity from centralized power stations; and (2) the carbonization of coal for the production of gas, coke, or smokeless fuel, and other important bye-products. The solution appears to be in the adoption of either of these alternatives or a combination of both.

The Electricity Proposals.

It is estimated that, with super-power stations, for every 100 tons of coal burnt there will be available for the consumer heat units approximating 18 tons of coal, or an efficiency of 18 p.ct. Now, if the work done at present with 33 million tons used for domestic purposes is to be done by electricity, then at least 50 million tons of coal will be necessary, if the anticipated results from super-power stations mature; and this will mean a loss to the country yearly of at least £12,750,000. We all realize that coal exports help to pay for food imports; and the coal representing this £12,750,000 could be put to better use in stabilizing our export trade. In addition to this, as raw coal would require to be consumed in boiler furnaces to produce electricity, and while the potential fuel lost in the form of soot from domestic fireplaces would be eliminated, the 500,000 tons of soot from industrial chimneys would be increased considerably. It would appear, therefore, that the loss financially to this country is one which our shattered resources cannot withstand, and the proposal would make little or no progress towards solving the smoke abatement problem.

The undernoted editorial from the "Edinburgh Evening News" of April 20 is of interest in connection with this matter, representing public opinion as it does.

The Smokeless Ideal.

Doubts as well as hopes are raised by the Smoke Abatement Bill which the Government have introduced in the Lords, and which is expected to come under discussion this week. Previous legislative endeavours in this line have not been particularly successful; and it is significant that the supporters of the present measure seem to lay less stress upon the actual provisions of the Bill than upon the potential driving power of the Minister of Health behind them. Upon him will depend the onus of compelling local authorities to make by-laws prescribing standards for smoke and periods during which such smoke may be emitted by industrial chimneys. The Bill does not concern household chimneys at all. Unfortunately, in connection with smoke abatement, local authorities are more prone to preach than to practise; and, as a matter of fact, so far as Edinburgh is concerned, it has been alleged that the worst offenders in certain districts are the Corporation electricity station chimneys.

It is, however, necessary to consider the problem from the consumer's point of view. Taking coal at 40s. per ton and an average of 25 p.ct. efficiency, the cost per therm of useful work done is 6½d.; and for electricity, taking the high over-all efficiency of 75 p.ct. and 1½d. per unit, 4s. 6d., or nine times that of the cost of coal. The average price of electricity sold in this country is much more than this; but the figure can be taken for comparison. I am convinced, therefore, that so long as coal remains the basic source of energy for the production of electricity, its use as a substitute for raw coal is not financially sound.

Still, Dr. Parker Smith is not so convinced; and recently he read a paper to the Institution of Electrical Engineers in Edinburgh, to which a considerable amount of publicity was given. He explains in detail the cost of running an all-electric house of ten rooms in Glasgow, where special rates as low as 0·375d. per kw.-h. are available, in order to popularize electricity in the home. A scale of costs for the various purposes is given; and I think it is advisable to reproduce it here.

Separate Meters.	Units of Electricity.	Costs. Per Annum.	Per Week.	Per Day.	Per Person.
		£ s. d.	s. d.	s. d.	d.
Heating	5954	19 3 7½	7 4½	1 0½	2
Hot water	1242 day 6043 night	4 0 0 9 8 10	5 2	0 9	1½
Cooking	2777	8 18 11½	3 5	0 6	1
Lighting	568	1 16 7	0 8½	0 1	¼

It should be noted that the average price paid per kw.-h. equals 0·637d. In the Glasgow Corporation Electricity Department's last financial year, the total expenditure, excluding capital charges, averaged 0·94d. per unit. There are few industries which can afford to trade in this manner. Even with the very special rates which have been arranged at the ordinary domestic rate for gas in Edinburgh the same number of heat units could have been supplied at practically half the cost—not by any means an encouraging argument for extending the use of electricity for domestic heating and cooking.

Discussing the paper, Prof. Baily, of the Heriot Watt College, Edinburgh, who is a well-known authority on electricity, stated that he could not share Dr. Parker Smith's optimism, and after giving the subject very careful consideration had come to the conclusion that the solution of the domestic problem of light, power, and heat lay in a combination of electricity and solid and gaseous fuel. It may be interesting to know that Prof. Baily has a gas fire for heating his room at the College, and has in use at his house a gas cooker, gas fires, and a gas wash boiler—surely a high compliment to the service which gas renders in the domestic sphere. The question, however, is not so much what is the cost of running a particular domestic service with coal, gas, or electricity (and figures quoted in this way are misleading, and take us nowhere), but the cost of performing a measured duty; and this being so, electricity for cooking and heating purposes is entirely ruled out on cost alone, apart from the criminal waste of our fuel resources and the pollution of the atmosphere.

The Case for Gas, Coke, or Smokeless Fuel.

This brings me to the second alternative to raw coal—*i.e.*, the carbonization of coal for the production of gas, coke, or smokeless fuel, and other important bye-products. Every 100 tons of coal dealt with in a modern gas-works supplies the equivalent, in heat units available in the form of smokeless fuel and tar, of 80 tons of coal, or a thermal efficiency in production of 80 p.ct. Now if the work done by the 33 million tons of raw coal used for domestic purposes at present were performed by smokeless fuel produced at gas-works, a saving of at least 5 million tons of coal would result; and this would be available for export at a value of £3,750,000. In addition to this, various bye-products would be available which would improve financially the position of the country; and the pollution of the atmosphere would be entirely eliminated, resulting in improved health of the people, and adding to the nation's comfort and prosperity.

It is necessary, however, again to consider the question from the consumer's point of view; and taking 6½d. as being the value of a therm of useful heat from coal, and taking gas at 3s. 6d. per 1000 c.ft., and an over-all efficiency of only 60 p.ct., the cost per therm of useful work done by gas would be 1s. 2d., or a little over 100 p.ct. more than coal. But there are many savings which would result, which, when taken into account, would improve the position of gas; and if coke be used in conjunction with gaseous fuel, the combination offers a sound, reasonable, and economic alternative to the use of raw coal for domestic purposes, from both the national and the public points of view.

This opinion is supported by the growing popularity of gas and coke for cooking and heating purposes; and I quote Edin-

burgh, so far as gas consumption goes, as an example. In 1901 the output of gas was 1750 million c.ft., and in 1919 it had increased to 2009 millions—approximately 15 p.ct. gain. From that date progress appears to have been more rapid; and in 1925 2599 million c.ft. were supplied, representing an increase of 29 p.ct. spread over the six years. These increases are general throughout the country; and to what can we attribute this growing popularity of gaseous fuel?

We all realize the importance of supplying cheap gas, and the part which it plays in popularizing its uses. Much money has been spent on research work in order to discover the most efficient methods of production; and the carbonization of coal in gas-works is one of the most scientific operations carried out in any industry. High thermal efficiencies are the order of the day, waste is entirely eliminated, and gas is produced of maximum purity and uniformity of quality; but finality has not yet been reached, and the public will continue to benefit financially from any new and improved methods which are discovered.

Methods of Charging for Gas.

Comparing the price of gas in Edinburgh in 1901 with the rate ruling to-day, there is little difference; this being chiefly due to higher charges for labour and raw materials. So it would appear that the greater use being made of the service is not entirely due to a lower gas rate. It is admitted that the comparison with other fuel shows a distinct advantage in favour of gas, and is the equivalent of a fall in price. Still, have we reached finality in our methods of charges? Can we not learn something from our competitors in the way of arranging tariffs? The general practice is a fixed domestic rate, with a cheaper rate for power and industrial purposes, both subject to discounts. This method of charge was arranged with the object of creating an even load factor, and has served its purpose. Practically all gas undertakings still supply about 50 p.ct. of their daily output during lighting hours; and the peak usually occurs during this period. It would appear, therefore, that each lighting consumer lost is a serious menace to our peak load. Now are preferential rates being offered in any case for gas consumed for lighting purposes? Are there any rates in use based on the number of lighting points? Has anything been done to encourage the continued use of gas for this purpose? Would the public welcome a change in our methods of charge?

Personally, I am of opinion that the most popular method of charge would be a graduated scale on the basis of actual consumption per term, irrespective of the period of the day or the purpose for which the gas is used. Under this arrangement, gas consumed for lighting purposes would contribute towards securing a cheaper rate. I realize that, apart from supplying cheap gas, we have other obligations to the public. Our duties only commence when gas is produced, and do not end until the consumer is satisfied. The public do not care whether they buy coal, gas, or electricity. What they desire to purchase is light, power, and heat; it matters not the form in which they are supplied. I believe the one essential factor which has popularized the use of gas is the manner in which our industry has complied with the demands made upon it, which I enumerate as follows:

(1) Supply of gas to new properties.
(2) Supply of gas of uniform quality and purity, and at constant and suitable pressures.
(3) The provision of appliances most suitable for their particular requirements as regards efficiency and safety, and in conformity with the highest standard of taste in design.
(4) Maintenance of these appliances in a condition to give the highest standard of efficiency and service, and to see that they are operated in a manner to give the most satisfactory result.

These demands are probably the most exacting imposed upon any industry; but the public appreciate service, and if we are to keep abreast of the times we must give that service in increasing abundance.

Supply of Gas to New Properties.

With the boom in building and the class of houses being erected—spread over a large area of ground—the cost of mains is a very serious item. The fact that water mains and drainage are immediately arranged as soon as feu is taken up, has a disquieting effect on the applicant; and gas being as essential a domestic requirement as the others, it is difficult to explain why it should not be laid under similar conditions. Now why, in cases where the municipality own the gas undertaking, should part of the cost of developing areas with the necessary public services not be chargeable against rates? Why should drainage be single in this respect, if gas is a necessity? Would it not be a contribution towards the desirable end—smoke abatement—from which the health of the community is to benefit, and assist in cheapening the cost of gas to the public?

An arrangement has been come to in order to assist to develop outlying areas, whereby the Lighting Department contribute 25 p.ct. of the cost of the mains, limited to a certain sum per annum. Our present practice, where long lengths of main are required, necessitating heavy outlay, and when an immediate remunerative return is unlikely, is to lay new mains and develop areas on the basis of individual guaranteed consumption; and many such agreements are in operation in Edinburgh, giving satisfaction to the public.

The question of charge for service pipes has also been a somewhat disagreeable problem, as it is customary to lay only 30 ft. free of charge. In order, however, to deal as fairly as possible with the consumer, we have in operation a scale of concessions for various types of appliances fitted, as shown in Appendix II. Builders of property appreciate these concessions; and the high-grade cooker, being an asset in any house, is usually fitted, with a resulting saving to the Gas Department of capital expenditure for supplying a cooker free on loan. I am convinced that dealings of this kind have done much to increase the goodwill of the public, and to secure for the Department a reputation for fair dealing.

Regulation regarding Quality and Pressure.

Practically all undertakings now supply gas of uniform quality and purity; and those operating under the Gas Regulation Act are penalized for any variation below the standard quality, while on the question of purity the consumers' interest is closely safeguarded. Gas may be of uniform quality, but if delivered at unsuitable or varying pressures it can never give satisfactory results. What, then, are the causes of variation in pressures and defective supplies, and what policy should be adopted to rectify same? Defective supplies I propose treating under the following heads:

Small and defective services.
Meters.
Small internal piping.

Small and Defective Services.—This is in my opinion one of the principal sources from which complaints arise; and no system of maintenance is complete unless examination is made of the service pipe. Twenty-four hour records should be taken continuously from service pipes on the district, and pressure readings should be taken in conjunction with meter surveys. It is in our own interests to look for deficiencies. Service pipes may become inadequate through one or more causes—*e.g.*, wastage and blockage, or through additional appliances being fitted. The practice in dealing with this matter varies throughout the country; some undertakings asking the consumer to contribute towards the cost of renewing the service—a demand which the public resent, and rightly so. I hold very strong views on this point; and from whatever cause a service pipe becomes defective I am of opinion the entire cost should be borne by the undertaking. I consider maintenance of service pipes is more important than that of consumers' appliances; and this is the arrangement which is in operation in Edinburgh. I go even further, and suggest that no installation is complete without the inclusion of a service governor. Might I also plead that the time has now come when district pressure should be maintained uniformly throughout the 24 hours, as it is during the daytime?

Meters.—The public demand an adequate supply; and there is no reason why any meter on the district should be worked beyond its rated capacity. It is a menace not only to the public, but to the undertaking. A merchant would never dream of using a balance rated at 1 cwt. to weigh a parcel of goods known to be over this amount; but still in many cases gas undertakings are content with their sales being measured in this way. Apart from this, an overworked meter causes a disturbance in the uniformity of pressure, and on this account should be replaced.

Small Internal Piping.—This is the most serious difficulty which is presented in providing a satisfactory supply. Undoubtedly the maintenance and replacement of internal piping in old properties is the duty of the owner of property; but it is difficult to bring this home. With inadequate carcassing, no satisfaction can result. Do we, however, take every opportunity, when fitting appliances, to improve matters? Take, for instance, where free loan cookers are supplied, a pipe has to be run from the meter—this applies also in cases where hire or hire-purchase appliances are being fitted. Does this not provide an opportunity of reviewing the whole question of internal carcassing? Do we take full advantage of the opportunity? Do we explain to the consumers that a pipe has to be run for a particular appliance, which we would be prepared to make large enough to augment the existing supply, if they in turn would contribute a share of the cost? The difference in size of pipe is the only additional cost, as labour and other charges are much the same. Are we doing ourselves full justice in ignoring such an opportunity? True, there is the question of the dual ownership; but is this a serious drawback? Once the cooker pipe is fitted, does it matter whether at a later date it is employed for any other purpose? It can only be used for the supply of gas; and it is in the consumer's and the undertaking's interest that it should be so. I am convinced that the solution of faulty internal carcassing lies in an arrangement of this kind; and I put it forward in the hope that those present will give an expression of their views on the matter.

Provision of Appliances.

The gas industry is in the fortunate position of having the opportunity of supplying the appliances for the consumption of their product. Have we abused in any way the duty entrusted to us? Have we kept abreast of the times in meeting modern

requirements? I think a visit to any showroom connected with a progressive undertaking will supply the answer. Appliances suitable for any purpose, as regards efficiency and safety, and in conformity with the highest standard of taste in design, are available. In this direction I think the gas industry has followed a splendid and progressive policy, and one which is appreciated by the public. Have we, however, adopted the same progressive policy in the providing of appliances for the consumer? This opens-up a very debatable point.

Do the public expect free gas appliances? Would it be a reasonable demand, and would it mean an increased gas consumption? Personally, I do not think so. Consumers would have an appliance in order to be fashionable, rather than for the service which it could render. In support of my argument, I instance Edinburgh, where free loan cookers are given, but during the last three years we have sold on hire-purchase and purchase systems nearly 4000 high-efficiency cookers, representing approximately 13 p.ct. of the total cookers on free loan. I agree that the supply of free loan cookers did much to popularize gas for cooking purposes; and I would not suggest it was bad policy. In addition, it made possible standardization, which has many advantages. But do the public to-day want an article of standard design, or the selection of a design most suitable for their particular requirements? My experience is that the public demand a selection, similar to other household furnishings. Gas appliances are part of the equipment of a modern house, and as such should be supplied by the occupier. It is difficult, where the policy of free loan has been adopted, to get away from it; but I am convinced it is not impossible, and that the public themselves, if given reasonable terms, will provide the solution.

My remarks on free loan apply equally to simple hire; and this method is only resorted to when the purchase outright or hire-purchase methods of sale have failed. We are offering the consumers the appliances at reasonable rates for purchase outright, and have limited the number of fires which we offer under simple hire. Then what do the public expect in return for their custom? The average gas consumer cannot find £10 to £15 for the purchase of a high-grade article which would be in keeping with the other household furnishings; but consumers can, and will, find the money if extended payments are offered. In support of this, I quote two fish friers who found guarantors for £100, and who each took fish-frying ranges on the extended payment system which they could not otherwise have had on the cash sale system.

Have we, therefore, exploited to the fullest the hire-purchase arrangement; and do the public wish it? Personally, I do not think we have made the most of it; and I feel certain an extended use would be welcomed by the public. To a large extent this system is in operation in Edinburgh; and over the last three years 2400 appliances have been sold in this way. In the case of cookers, fifteen payments are arranged over a period of five years; and in the case of fires and geysers, nine payments over a period of three years. The rates include cost of fitting and maintenance during the period of purchase. I am strongly of opinion that a sound scheme of hire-purchase, including all classes of appliances, with rates based on remunerative terms, would meet the public, and automatically substitute private ownership for hire and loan appliances.

Maintenance of Appliances.

What part in an installation of gas does the appliance play? It is the means of transferring a source of energy into useful work; and no satisfaction can result unless appliances are maintained at the highest possible efficiency. Of what value are our works, workshops, and internal organization, if the consumers' appliances are not adjusted to give the most satisfactory results and the greatest economy in service? It has been ascertained that consumers are generally unable to keep their own installations up to standard pitch, and invariably do not complain when a slight falling-off in efficiency takes place. Every appliance which is not working to efficiency is creating a bad impression on the public mind. To leave the work of repairing and maintaining our consumers' appliances to people who are only interested in that work for the profit it offers, is not good practice. Since our commodities are now the everyday requirement of the housewife, it does seem as if the policy of leaving the appliances to look after themselves is one which should not exist.

Regular attention to your consumers is bound to create a good impression, and affords a splendid opportunity for gaining new business. Gas appliances require maintenance. I am strongly of opinion that any gas undertaking without a free maintenance scheme is not fulfilling its obligations to the public. The need for the free maintenance scheme in our industry has often been referred to. I will not labour its importance further.

To see that appliances are operated in the most efficient manner, we have a demonstration room, and periodically hold lectures and demonstrations in various parts of the city. With each appliance sent out, a call is made by our lady demonstrator, to educate the user in the correct method of utilizing the appliance. We also have an arrangement whereby a demonstrator is available for any consumer who may find difficulties in using her apparatus. The public appreciate this; and where such service exists, there is a healthy growth in output.

Conclusions.

Reviewing the whole position, I am certain that the continued use of raw coal for domestic purposes is unnecessary, and is the result of the lack of an intelligent understanding of the real value of our coal resources; that the El Dorado of electrical production does not offer a reasonable or economic alternative to coal for domestic requirements; and that the only policy which can be recommended and proved to be stable is that of pretreating the coal on lines similar to those adopted at the gas-works. Solid and gaseous fuels are produced at costs comparable with raw coal, especially when the services which we render to the public are taken into account. I am convinced that the continued growth and prosperity of our industry is entirely due to our policy of giving the public a "square deal."

APPENDIX I.

Gas Fires: An Appreciation by an Edinburgh Physician.

I should like to say something in favour of gas, as an aid to domestic comfort. I speak from seven years' experience, during which I have gradually added more and more gas appliances, till now I have only one coal fire left—the kitchen.

Cost.—If I had no gas fires, five coal fires would have to be kept going all day— namely, drawing-room, dining-room, consulting-room, waiting-room, kitchen—others would be needed occasionally. On the basis of last winter's consumption of half-a-ton of coal per fire per month, this would mean 2½ tons at least each month. Reckoning the coal at 40s. (last winter's prices), this would amount to £15 a quarter. My gas bill in February, 1922, for five gas fires and lighting for the whole house (with gas at 5s. 8d.), was £21 10s. 8d.; so it may fairly be said that there is not much to choose between actual cost of coal and cost of gas for fires. The term "gas fire" must be taken to mean only the radiant-heat type of fire.

But there are other considerations than cost. Actual saving can be effected, as I shall show. My wife and one maid can cover all the work of the house; but they could not do so if all those coal fires had to be kept going. Another maid would be a necessity. So there is a clear saving of (say) £90 a year for a maid's board and wages. Sticks, matches, and firelighters are another clear saving— or any other method of lighting, such as a gas poker. Yet another item of saving can be reckoned under papering and painting. How long does white or cream paint keep clean in a room with a coal fire? Remove a picture from a room heated by coal; there is an ugly patch on the wall, and something must be put up to hide it. There is no such difficulty with gas heating.

To my mind, a gas fire is far superior in appearance to any electric fire I have yet seen; and one can have exactly the right size of fire for the size of room to be heated.

APPENDIX II.

Edinburgh Corporation Gas Department.

Concessions in cost of Service Pipe in excess of 30 ft. allowed for fitting gas appliances.

Cooker supplied and fitted	£3.
One fire ,, ,,	No allowance.
Two fires ,, ,,	£1.
Three fires ,, ,,	£3.
Four fires ,, ,,	£5.
Six fires ,, ,,	£4.
Wash boiler supplied and fitted	No allowance.
Geyser or other hot water appliance supplied and fitted	£2.

Discussion.

Ex-Bailie Baxter (Edinburgh) said he had come to the present gathering with the idea of seeing the representatives of a dying industry; and he was bound to confess that he had rarely encountered a more healthy or lively-looking lot. His own candid opinion was that the gas industry was far from dying. In Mr. Jamieson, they had one who was specially interested in the manufacture and distribution of gas. He was born in the profession; and, of course, it was quite natural that his enthusiasm for it should be particularly keen. In the paper Mr. Jamieson had submitted, he had been very frank in explaining to them how far they had to go before they reached that state of efficiency they all expected to reach. Personally, he (the speaker) was going to give the electrical industry credit for stirring the gas industry into action. But for it, the gas industry might still have been asleep. Rapid progress had been made in recent years by the gas industry; and he made bold to prophesy that still more rapid progress would be made in the immediate future. In Edinburgh, he was a member of the Electric Lighting Committee, as well as of the Gas Committee; and his experience in this dual capacity went to show that the one department did not try in the least to help the other. Mr. Jamieson had already explained his views in regard to electricity; and his reference to this subject had not been tinged with too much criticism. He believed it would be possible for the gas industry to effect great economies in future. As things were at present, he understood there were 300 therms in a ton of coal; and for long he had held the idea that the industry should set out to investigate how it was that they took only 70 out of these 300 therms. It had always seemed to him that more could be done in that direction. As to electricity, he had gone carefully into figures, and found that the city of Glasgow expended fully £14,000 in order to get a revenue of something like £4550. This sort of thing could surely not continue for long; and, at all events, there was not much to fear from competition of that description. The electric cooker had not justified itself in Edinburgh, even although that was a popular residential city. Up to date, they had only sold or hired some 200 or so electrical cookers; and quite 30 p.ct. of this business must have been done within the past three or four years. In Edinburgh, from this source he believed there would be a revenue of £400; and

on maintenance something like £150 per annum had to be expended. Altogether, he felt that gas had little, if anything, to fear from electricity.

Mr. J. W. McLUSKY (Glasgow) remarked that the paper was full of suggestive points. At the present stage, he felt it would not be altogether fair of him to say too much in regard to this paper, because he understood that at the June meeting of the Institution the subject of service to the consumer would be specially under discussion. The conviction was now being borne in upon him that the gas industry must reconstruct its tariffs. In America and other countries they had a scale of charging that was infinitely fairer to the consumer than the method practised in this country. The electrical industry worked on a sliding tariff. He knew, for instance, the price that was charged for electricity which was supplied to the Provan Gas-Works. The Gas Department there took 2 million units; and the price charged was 0·6d. per unit. This was such a low figure that he made bold to say electricity could not be beaten by any kind of fuel. No doubt they could raise steam with coke breeze, and charge themselves nothing for the cost of the breeze; but when labour was taken into account, 0·6d. per unit would beat even that arrangement. So far as the Maclaurin plant was concerned he ought not to say a great deal at the present juncture. The fact of the matter was that the Maclaurin plant had not yet reached the stage at which it could be reported upon. It was fair, however, to say that this plant was capable of producing 69 therms per ton, though it was only right to point out that it was very low-grade gas. The plant was not being experimented with for gas, but rather as a test for smokeless fuel. They were standing on the threshold of a great national scheme for the production of electricity; and it seemed to him that now was the time for the gas industry to reconstruct its tariffs and meet the electrical engineer and his day-load factor with an entirely new load factor on the gas side. Were they aware that in Chicago, if a consumer reached a certain consumption of gas, the cost fell to half the original price? There was something reasonable in an arrangement of this kind; but, of course, they would all agree that, if gas was offered at 1s. per 1000 c.ft. to consumers, they would require to consider the question of plant. Why should the city of Glasgow supply suburbs where the average consumption was 70,000 c.ft., and charge the same rate in another district where the average consumption was only 15,000 c.ft.? The system of charging was, to his mind, all wrong. Because the owner of a villa in Pollokshields, Glasgow, had more money than some others in the city, that was no reason why he should pay more for his gas. That was not the way they looked at things in America. It was the quantity of gas consumed they looked at; and they fixed their price standards on this basis. It seemed to him they would never be able to compete successfully with electricity, until they had re-adjusted their tariffs on the lines he had indicated.

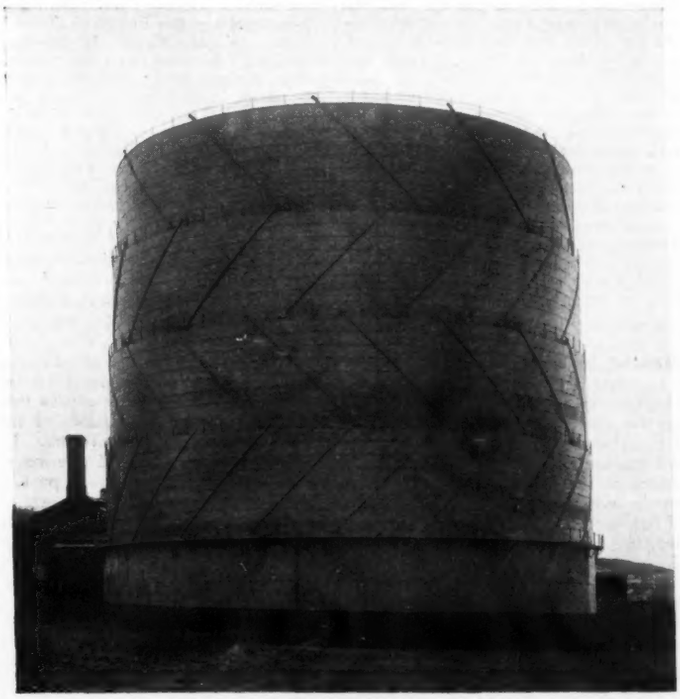
Mr. W. M. MASON said he rose, on behalf of the Association, to extend sincere thanks to Mr. Jamieson for his paper. The discussion had been curtailed owing to lack of time; but, even so, the paper itself would secure very wide publicity. After all, this was the main point—to let the public see that the gas industry was very much alive at the moment.

Mr. JAMIESON briefly acknowledged the vote; and the meeting terminated with a similar compliment to the Chairman.

PERTH GAS UNDERTAKING CENTENARY.

Inauguration of a New Gasholder.

The gas industry in Scotland was very strongly represented on Friday last at the inauguration of a new holder at Friarton, Perth. Practically all the Engineers of the larger cities and towns of the country were present to mark fittingly the centenary of the introduction of gas into the city, and to pay a tribute to the skill and capable management displayed for so long by Mr. David Vass, the Resident Gas Engineer. In Perth, the manufacture and distribution of gas is municipally directed; and the record of achievement has been a good one.



THE NEW PERTH HOLDER.

THE NEW HOLDER.

The new gasholder is situated outside the old boundary of the works, upon land purchased some time ago; and it has been surrounded with a metal fence, asbestos covered to protect it against corrosion. The weight of the tank and holder approximates 14,000 tons; and they are erected on a concrete slab 134 ft. in diameter by 2 ft. thick. The steel tank is 132 ft. 1½ in. in diameter by 27 ft. 8 in. deep; and it has a substantial balcony and handrail round the top. The inner lift is 122 ft. 6 in. in diameter; the second, 125 ft.; the third, 127 ft. 6 in.; the outer lift, 130 ft.; all being 27 ft. deep. The inlet and outlet pipes are 24 in. in diameter. The holder has a working capacity of 1¼ million c.ft.; and the minimum pressure thrown is 5¾ in., while the total pressure given is 13¾ in.

The carriages throughout are of the "Bearscot" type. The grip carriages are fitted with twin yoke and linked rollers; the tank carriages being of the single yoke quadruple roller type. All are fitted with self-acting lubricators. The upper ends of the spiral rails are fitted with run-down stops, and the side plates are extended above the dips and top curb to prevent drainings running down the sides and disfiguring the painting. Special provision is made for the ends of the spiral plates at the upper and lower rows of side plates on the lifts; and a level dip is ensured for the carriages by the bent vertical stays secured to the underside of the dip channel.

The crown of the holder is trussed; the ends at the sides being supported on a lower top curb, by which method holes for bolts, &c., are not needed in the upper curb, which is straight riveted throughout to both the crown and side plates. The roof bracket bars or purlins are of the continuous circular type, secured to the upper side of the main bars; and the crown sheets are 10 ft. long. Anti-freezers are provided for all the lifts and the tank; while a staircase gives access to the tank balcony and ladders to the crown.

The foundation work was carried out under the inspection of the Engineer; and the gasholder and steel tank were erected by Messrs. R. & J. Dempster, Ltd., of Manchester. We understand the holder is almost a replica of others already existing at Dunfermline and Motherwell.

Luncheon.

A large company assembled for the luncheon, which was held in the Station Hotel. Lord Provost Thomas Dempster, who presided, was accompanied at the head of the table by Bailie Stewart (Gas Convener, Edinburgh), Bailie Stewart (the present Convener of the Perth Gas Committee), ex-Bailie Hunter (a former Convener of the Committee, under whose régime the operations at Friarton were started some years ago), Mr. J. W. McLusky (Gas Engineer, Glasgow), Mr. W. M. Mason (Manager of the British Commercial Gas Association), Bailie Taylor (Perth), Mr. Charles Dempster (representing the contractors), and others. The Loyal Toast having been duly honoured,

Bailie Stewart (Edinburgh) proposed "The Lord Provost, Magistrates, and Councillors of the City of Perth;" and Lord Provost Dempster acknowledged it. In the course of his reply, the Lord Provost said the Corporation of Perth was glad to be in a position to welcome such a large and representative gathering of the gas industry in Scotland. Personally, he could claim none of the credit for the high position Perth held in the gas industry; but he could say this—that the Town Council of to-day would endeavour to uphold the traditions and reputation of the undertaking.

Bailie Stewart (Perth) proposed "The Contractors," coupled with the name of Mr. Charles Dempster. He said that for the holder which had now been completed the Town Council had been most fortunate in the choice of contractors. The holder had been erected by Messrs. R. & J. Dempster, Ltd., of Manchester; and this was not the first commission that firm had taken on hand for Perth. The total cost of the gas improvement scheme had been £32,000; and the whole of the capital sum would be repaid in fifteen years. It was satisfactory to note that the scheme, which had received the imprimatur of the Unemployment Grants Committee, had given employment to a large number of local workers during a period of industrial depression.

Mr. Charles Dempster reminded the company that his name was a Scottish one; and, as a matter of fact, his uncle, the late Mr. Robert Dempster, was born but a very short distance from the place they were now meeting in. So far as his own firm were concerned, they had to acknowledge their indebtedness to the city's very able Engineer (Mr. Vass), who had been of great assistance to them during the whole of the operations, which had proceeded smoothly from start to finish. It was gratifying to hear that, despite the industrial depression which was affecting this district as well as many others in Scotland, the consumption of gas in Perth was steadily increasing. On behalf of the contractors, he had been asked to present Lord Provost Dempster with a piece of silver plate, not only as a memento of the function that day, but in recognition of the attainment of the city's centenary as a gas producing area. Thereafter, he asked Bailie Stewart and ex-Bailie Hunter to accept pieces of cut crystal glass from his (the speaker's) own firm.

Lord Provost Dempster said this gift came to him as an entire surprise. As, however, this was the centenary year of the gas undertaking in Perth, he accepted the silver salver as something commemorative of that interesting event.

Ex-Bailie Hunter said he had been Convener of the Gas Committee in Perth for six years; and during his period of service he had striven, with the Gas Manager, to make the works the finest, the best equipped, and the most modern in Scotland. For the success that had been achieved during these years he took very little credit. Indeed, the real credit lay with Mr. Vass. It seemed to him that the people of Perth, and even the Town Council, did not quite realize the volume of work that was done by Mr. Vass and his staff. The drawing up of the plans for the contract now completed, as well as the framing of specifications, had been done wholly and solely by Mr. Vass. There had been no need to call in a consulting engineer; and in this way Mr. Vass and his staff had saved the Town Council a substantial amount. During the progress of the work, he had had the pleasure of being associated with Mr. Dempster and his colleague, Mr. Scott; and the relationship had always been most cordial.

Bailie Stewart also briefly acknowledged his gift.

Mr. J. W. McLusky proposed "The Gas Industry," coupled with the name of Mr. Mason. At the outset, the speaker remarked that it was very refreshing to hear the speeches which had been delivered that day by two Gas Conveners. As gas engineers, they had to acknowledge that, after gas, the most important thing they had to distribute was knowledge. No one knew better than the modern gas manager how dangerous a little knowledge was. After a hundred years of gas in Perth, the city was still going strong. Just the other day, he noticed a paper referring to the gas industry as an "antique industry." This remark was far from justified. During the past twenty years, the gas industry had increased by 50 p.ct. This might not sound a great deal; but if they applied it to shipbuilding, engineering, and the textile industry, they were bound to realize that it meant a very great deal. Just let them imagine what this country would be like if every industry had developed 50 p.ct. since 1906. The gas industry had 8¾ million consumers, which represented a population of 33 millions. At the moment they were supplying practically everyone in the country with gas. Not only so, but the figures were much more interesting still. For every 85 consumers in this country, gas gave employment to one man. The real truth was that far from being an antique, the gas industry was rapidly developing. Mr. McLusky proceeded to congratulate Mr. Mason on the able way in which he was handling his work on behalf of the "B.C.G.A." The gas industry in Glasgow—through the instrumentality of one of its ablest gas Conveners, Sir Thomas Paxton, had given Mr. Mason to London for the benefit of the gas industry. They had never regretted that.

Mr. W. M. Mason, in the course of his reply, contrasted the position a hundred years ago with the present time, when he claimed that gas was being used for 3000 trades, with an average of seven processes in each trade. To-day he made bo'd to say that gas was doing in the heating world what electricity could not do, and never would be able to do. The industry had a great future before it; and their task now was to push ahead and get on with the job.

The health of "The Chairman" was pledged, on the call of Bailie Taylor, of Perth.

A Centenary Brochure.

In connection with the centenary celebration a full and handsome brochure was prepared, notice of which is unavoidably held over from this issue of the "Journal."

Brass Melting by Gas.

Highly satisfactory work is being accomplished by a battery of gas-fired, surface combustion, recuperative crucible brass melting furnaces installed at the works of the C. A. Goldsmith Company, of Newark (N.J.). The air is raised to a pressure of 1 or 2 lbs.; and the air and gas are exactly and automatically proportioned for complete combustion, which takes place in a refractory tunnel just prior to entering the furnace. The escaping hot gases are utilized in the recuperator to preheat the air to 900° or 1000° Fahr. before it is mixed with the gas. Crucible pedestal troubles have been overcome in this furnace by using a special casting under the pedestal, through which cold air passes before entering the recuperator. From figures quoted by Mr. J. B. Nealey in the "Gas Age-Record," the first heat requires from 80 to 90 minutes; subsequent melts taking approximately 60 minutes. The melting speed of a gas-fired crucible furnace is therefore very high; and in the time it takes to melt three heats in the pit-fired furnace, five can be melted in the gas furnace using cold air, and from seven to eight with air heated in the recuperator. The fuel economies of the recuperators are evidenced by the fact that when melting red brass with cold air and gas, the fuel consumption is about 500 c.ft. per 100 lbs. of metal; but when the incoming air is heated by the waste gases, the fuel consumption is reduced to approximately 300 c.ft. per 100 lbs. after the furnace has been heated to melting temperature. While the cost of gas varies little from the cost of coal, there are many advantages in favour of the former, not the least of which is a reduction in metal losses amounting to about 50 p.ct., due to the shorter time the alloy remains in the furnace.

Research on Fuels.

In the second issue of the new American publication "Coal," there is reprinted a paper from "The Annals" of the American Academy of Political and Social Science, by Mr. A. C. Fieldner, Chief Chemist to the United States Bureau of Mines and Superintendent of the Pittsburgh Experiment Station. It is entitled "Significant Progress in Research on Fuels;" and in it Mr. Fieldner states that the world war forced upon every nation a realization of the tremendous importance of fuels in their various forms. It demonstrated the value of scientific research, and the need for each nation to provide adequate sources of those particular forms of fuel that were best adapted to modern warfare. It stimulated much research along lines which did not promise commercial returns under ordinary conditions, but which promised means of obtaining the necessary forms of fuel when the nations were thrown entirely upon their domestic resources. Every important nation has established, either directly or indirectly, fuel research laboratories for carrying on these important investigations. The result is evident from a glance at the enormous increase in the literature on this subject. There is, he thinks, every indication that interest in fuel technology will continue to increase in the future. The only drawback is the lag between research and practice. Where direct monetary returns are to be obtained, practice seizes upon the results of research at once; but in the more general field of conservation, in more complete extraction of the coal from the ground, in the adoption of smokeless fuels at a somewhat higher cost, and in the elimination of known unsafe practices in mining, much educational work remains to be done. It is, Mr. Fieldner concludes, hoped that practice will follow the pioneering line of research in these more altruistic aims much more closely in the future than it has done in the past.

The Coke Oven Managers' Association are arranging a visit to some important works in France and Belgium in September. It is proposed to leave England on Sept. 3, for the purpose of inspecting the Becker plant and Hurez washer at Drocourt, the synthetic ammonia and alcohol plant at Bethune, and the Packard "Synthol" plant. Other objectives are suggested, including the Sulzer dry quenching process; but fuller particulars will be announced later.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Visit to Messrs. Brotherton's Works at Stourton.

The members of the Yorkshire Junior Gas Association spent an interesting and informative afternoon on April 28 in visiting the extensive chemical works of Messrs. Brotherton & Co., Ltd., at Stourton. The visit was arranged originally for Saturday, April 17, but in order that the plant might be seen at work, thereby making the visit much more instructive, Messrs. Brotherton kindly agreed to a change of date to a Wednesday. The visit was arranged by Mr. John Russell, a Director of the Company.

The party, accompanied by the President (Mr. R. N. Webb, of Leeds), were received at the works by Mr. T. A. Stocks, Works Engineer, Mr. H. C. Dungey, Head Chemist, and Mr. W. A. Bell, Chemist, who acted as guides in conducting the visitors round the plant, where work was in full progress.

VISIT TO STOURTON WORKS.

The Stourton Works of Messrs. Brotherton & Co., Ltd., is one of the largest and most up-to-date tar distillation works in the country.

Tar Distillation Plant.—A semi-continuous process is used. The crude tar is pumped through a heat exchanger into the first still, where the ammonia liquor and crude naphtha distil off, their vapours passing through the heat exchanger to the final condensers. The tar from the first still passes into the second by gravity. Light oil is distilled off in this still, and the now completely dehydrated tar overflows into one of the intermittent finishing stills. The plant is so proportioned that, by the time one still is fully charged, another has been worked off, the pitch discharged, and the plant is ready for charging. The stills are heated by direct firing, and live steam is introduced into the finishing stills in the usual way during the last stages of distillation. The plant is worked partly for pitch, but large quantities of refined tar are made.

Vacuum Oil Distillation Plant.—This section of the plant has recently been erected, the stills being of the firm's standard pattern, working under vacuum, fitted with fractionating columns and closed receivers, &c., of the most modern type. The naphthas are separated from the oils at this plant and passed on to the benzole plant to be rectified. Fire stills are used for distillation of the heavier oils and production of naphthalene oil, &c.

Naphthalene Plant.—Consists of mechanically stirred crystallizers and hydro-extractors—all electrically driven—for the production of whizzed naphthalene.

Anthracene Plant.—The heavy oil is here cooled in vats, and the anthracene separated in filter presses. It is further purified by washing with solvents, and whizzing.

Crude Carbolic Acid Plant.—This section has also been entirely remodelled during the last few years. It consists of:

Caustic Plant.—Two causticizers are in use, provided with settlers and vacuum filters for dealing with the waste lime.

Oil Washing Plant.—A Peppers' extractor is used with various improvements and modifications suggested by experience. The oils leave this section free from tar acids, and the carbolate is passed on to the

Decomposing Towers.—Coke furnaces are used for the generation of CO_2, the waste heat being utilized for raising the temperature of soda carb. liquor ready for causticization. The CO_2 is drawn from the furnaces by a fan, and passed up the decomposing towers, where it reacts with the carbolate, producing sodium carbonate and crude tar acid. The soda carb. is recausticized, and the crude tar acid is passed on to the pure carbolic acid plant. All pumps, fans, &c., on this plant are electrically driven.

Rectified Naphtha Plant.—Crude benzole is here worked in the usual way, being first washed with sulphuric acid to remove impurities, and then distilled, producing motor benzole, solvent naphtha, &c.

Pyridine Plant.—The oils are washed with dilute sulphuric acid, which extracts the pyridine in the form of pyridine sulphate, which is then decomposed by soda, producing crude pyridine bases. The latter are distilled first in a fire-heated still, and then in a steam still, with the production of rectified pyridine bases.

Pure Carbolic Acid Plant.—Crude carbolic acid is worked up at this plant by means of repeated crystallizations and distillations, the products made being: Carbolic acid crystals (phenol), improved pale cresylic acid (99 to 100 p.ct.), ortho, meta, and para cresols, dark cresylic acid (various grades), "Unisol" (high-grade "Lysol"), and stannin (synthetic tannin). On this plant the stills are heated by superheated steam, and all vacuum, air, and product pumps are driven by electric motors.

Steam Generation Plant.—With the exception of certain steam pumps, the whole of the steam generated is employed for process. Electricity is used for motive power wherever possible. The steam plant consists of Lancashire boilers, Sugden superheaters, Bennis stokers of the sprinkler type, and compressed air furnaces, enabling a low-grade fuel to be used. Water supply is from neighbouring canal *via* softening plant. Green's economizers are installed.

Electrical Installation.—Power is supplied by the Yorkshire Electric Power Company at 10,000 volts, and is transformed to 100 volts in the Company's sub-station. Distribution is grouped into convenient circuits, and all mains are of the armoured pattern and laid underground where possible. All switch gear of over 2½ H.P. is of the automatic oil-immersed pattern, and fitted with overload and no-load releases, thus affording full protection to motors. Where necessary, to eliminate all risk of fire, or when unduly exposed, motors are of the totally-enclosed pattern.

At the conclusion of the tour of inspection,

Mr. WEBB proposed a hearty vote of thanks to Messrs. Brotherton & Co., Ltd., to Mr. John Russell, and to the guides. He said that everybody had been delighted with the opportunity of visiting an undertaking which was widely known and esteemed not only in the chemical industries, but also in the gas industry. On behalf of the members he congratulated the firm on the up-to-date and ingenious plant in operation.

Mr. PERCY WARD (Bradford), seconding the motion, said that at these works the labour problem seemed to have been solved, for while there were many processes carried out, comparatively few men were required in each.

Mr. STOCKS, acknowledging the thanks, said that so far as the workmen were concerned, the firm did whatever they could to reward adequately the services of their employees. Bonuses were paid proportionate to output; and they considered that plan to be on right lines. The firm were out to introduce the latest and best labour-saving machinery obtainable; and he was glad that the members had that afternoon been able to witness the plant in full working.

Mr. DUNGEY also briefly acknowledged the vote.

MESSRS. BROTHERTON'S STOURTON WORKS.

Gas for Stainless Steel Knife Making.—It is computed that the entire process of forging, hardening, tempering, and cooling 160 gross of stainless knife blades requires 80,000 c.ft of gas, or less than 4 c.ft. per blade. It is pointed out by the "American Gas Journal" that the manufacturer of stainless steel table knives demands precision of heat control, and to obtain this a factory producing 160 gross of stainless steel blades a week has recently installed a complete gas-fired equipment for the processes named. Formerly, in the production of steel knife blades, the temperature of the furnace was gauged by workmen looking through sight holes; but with the development of stainless steel, pyrometers have come into general use. For forging, the steel is heated to 1000° C.; and if this limit is exceeded, the steel cracks. The blades are hardened in oil at 950° C. Greater heat makes the blades brittle, and less heat fails to render them stain-resistant.

SOCIETY OF CHEMICAL INDUSTRY.

Meeting with Chemical Engineering Group at Birmingham.

A joint meeting of the Birmingham and Midland Section of the Society of Chemical Industry and the Chemical Engineering Group was held at Birmingham on Tuesday, April 20. In the afternoon the party paid a visit to the Soho Foundry of Messrs. W. & T. Avery, Ltd. A tour was made of the various departments, and the company also inspected the famous gasholder erected over a century ago by Murdoch, which until recently was used by the firm.

The subject before the meeting was "Weighing and Measuring in the Chemical Industries;" and the papers read were: "Measuring and Weighing Apparatus as applied to Chemical Works," by Mr. W. A. Benton (Head of the Research Department of Messrs. W. & T. Avery, Ltd.), and "Rotameters in Chemical Industry," by Mr. W. Hall-Simmons, A.I.C., and Mr. F. Colin Sutton, B.Sc.

In his paper, Mr. W. A. Benton spoke of the chemical balance, and warned chemists to pay more attention, when purchasing instruments for their laboratories, to the construction of the mechanical parts, the relieving devices, and the like, than to extreme sensitivity. Some Continental makers at the present time sacrificed reliability, endurance, and real accuracy to sensitivity. Extreme sensitivity was by no means the most important quality in an ordinary laboratory or analytical balance. Platforms and weighbridges were dealt with, and it was pointed out that a modern high-class weighbridge possesses sensitivity and accuracy of the same order as an ordinary chemical balance. Machines could be made to record the coal and water consumptions on charts, or on one and the same chart. He felt sure that eventually this would become a standard method of checking boiler plant economies. It was direct. Its records needed no interpretation. They gave just what the engineer and the financial authority wanted to know—namely, water evaporated per pound of coal. Too often the real facts were hidden under a cloud of CO_2 readings, thermometer readings, and the like; and what actually was happening with any particular boiler during ordinary use—as distinguished from what happened on the occasion of a full-dress test—was entirely lost sight of. The CO_2 recorder was a useful and, indeed, almost indispensable instrument in the hands of a skilled power-station engineer with a sound knowledge of the chemistry of combustion; but the blind faith shown by many engineers in the supposed inevitable relationship of high CO_2 readings with high boiler-plant economy was one of the strangest phenomena of recent years, and not very creditable to the engineering profession. A little knowledge of chemistry would have prevented some of the more glaring absurdities that came under one's notice when engaged in general engineering practice. A well-known consulting engineer told him recently that in a survey of a large number of plants he had been unable to find any understandable relationship between the CO_2 records and real boiler economies. Mr. Benton said he had never found a stoker so dull as not to be able to give his employer a high CO_2 reading.

The contribution on "Rotameters in Chemical Industry" was read by Mr. H. R. Trost, B.Sc.

CONSTITUTION OF COAL.

A meeting of the Manchester Section of the Society of Chemical Industry was held at the Textile Institute on April 9—Mr. L. Guy Radcliffe, M.Sc.Tech., F.I.C., presiding.

Dr. R. V. Wheeler, F.I.C., Professor of Fuel Technology in the University of Sheffield, read a paper entitled "The Constitution of Coal," in which he said he had come to the conclusion that the constitution of coal was not so complicated as had been formerly believed. As the result of recent research work in Sheffield, there was now greater hope of being able to explain the nature of its chemical compounds, and the manner in which they affected its quality, owing to the recognition of the presence of ulmic compounds, to which attention was first directed by Thompson in 1807 in his investigation of the particular form of material in decayed elm trees. These compounds were characterized by their solubility in alkaline solutions, to which they imparted a deep brown colour. It had been found that, by mild oxidation of bituminous coal—*e.g.*, by atmospheric air at a temperature of approximately 200° C.—it was possible to transform the whole of some coals into substances which were completely soluble in caustic potash. The ulmins, or the products of bacterial alteration of cellulose and compound celluloses, were thus regenerated, showing that the whole of that coal was composed of ulmic material.

The four ingredients of bituminous coal—vitrain, durain, clarain, and fusain—differed markedly, not only in their microscopical appearance, but in their chemical properties. The particular ingredient of coal which could be rendered completely soluble by regulated oxidation was vitrain; and the conclusion to be drawn from this fact was that it was essentially ulmic in character. It was, in fact, the bacterial product of the ligneous tissue of plants. Clarain could be rendered almost soluble, leaving an insoluble residue composed of the cuticular parts of leaves and stems and spore exines, which apparently remained unchanged in the coal, and could be examined separately. Durain was also partly soluble in caustic potash, and deposited plant entities resistant to solubility.

In the case of British coals, the amount of insoluble plant entities in clarain and durain was approximately 10 to 15 p.ct.; the remainder of the composition being ulmic in character. If it was recognized that the vitrain portion of the coal was essentially ulmic in character, then 90 p.ct. of the clarain constituent was also ulmic, and of durain 70 p.ct. This conclusion was based upon purely chemical grounds, and conformed with actual observation of the plant entities which could be separated from those three different ingredients of coal. The deduction was thus drawn that ordinary bituminous coal consisted of a material containing certain plant entities which had not been acted upon by bacteria, and had not altered in form.

The research work at the Sheffield University, on the one hand, had been to investigate the chemical properties of the coal material, and, on the other hand, to ascertain the different plant entities which could be separated from it. The ulmic material had been examined both by synthetic and by other means.

The organized plant entities of importance were the cuticles and the spores. Other plant entities which resisted decay were resins, which were undoubtedly present in vitrain, and could be separated out in the form of rods.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Gas Meter Prices.

Sir,—We have read with interest the letter by Mr. R. G. Shadbolt, in your issue of April 28, and the proposal he makes to terminate the present unfortunate condition of the meter trade, which, for the reasons he has clearly stated, is calculated to injure not merely meter makers, but also the still larger interests of gas suppliers and gas consumers.

Mr. Shadbolt has asked for expressions of opinion in the Press. For our own part, we are prepared to assist in any practical way in our power, should the scheme commend itself to other members of the industry. In fact, some months ago we made a very similar suggestion, supported by similar reasons.

Thomas Glover & Co., Ltd.

38, *Grosvenor Gardens,*
London, S.W. 1,
April 29, 1926.

Wrought Iron and Steel Tubes.

Sir,—Would you kindly allow a little space in the "Journal," in order that we may have an opportunity of definitely refuting the statement made in a letter which you printed in your issue of the 21st inst., in regard to iron and steel tubes.

For upwards of fifty years we have manufactured wrought iron from puddled bar, for the purpose of tube making. Any customer who demands from us puddled wrought iron quality, need have no fear whatever of being supplied with a quality other than that which he orders. We have a varied and extensive connection for this class of tubing; and we can agree with the writer of the letter referred to, that there is an increasing demand for genuine wrought-iron tubes. We do not, however, confine ourselves entirely to wrought iron; and we have at the call of our customer wrought mild steel tubing, if he so desires.

p.p. John Russell & Co., Ltd.,
P. C. Marshall, Secretary.

Alma Tube Works,
Walsall,
April 29, 1926.

Sir,—In your issue of April 21, we observe, in the correspondence column, a letter from Mr. Woodfine, the Manager of the Wellington (Salop) Gas Company, in which it is stated that a representative from a tube firm has remarked to him that very few, if any, tube makers used puddled wrought iron.

We think this statement does considerable injustice to the tube works who do manufacture genuine wrought-iron tubes. We shall therefore be grateful if you will permit us to say, through your columns, that we have been manufacturers of genuine wrought-iron tubes ever since our foundation; and to-day we are still making this quality of tube with every success, and have no difficulty in obtaining sufficient supplies of puddled wrought-iron strip from which the tubes are manufactured. We think if British gas-works engineers and managers would make more pertinent inquiries of the travellers who

call on them, and stipulate that only tubes made from genuine Staffordshire puddled wrought iron would be accepted, the value of such remarks would soon be seen.

It cannot be too well known that steel tubes are inferior to iron tubes; and in very many instances the steel is of Continental origin. As we are mainly concerned in the production of iron tubes, we shall be quite willing and prepared to give a suitable guarantee to any gas-works specifying iron tubes that the material used by us will be obtained from Staffordshire iron-works making the genuine puddled wrought iron.

For EDWARD SMITH, LTD.,
THEODORE SMITH,
Director and Secretary.

Brunswick Tube Works,
Wednesbury,
April 30, 1926.

Mr. Horstmann's Lecture.

SIR,—With reference to your report of Mr. Horstmann's lecture at the British Horological Institute on April 21, as we consider this lecture contains so many inaccurate statements damaging to this Company, we are saying nothing further at present in answer thereto, other than that we are seeking advice as to what actior is best to take in the matter.

Perhaps you will be good enough to say so in your journal, as you gave such publicity to the lecture.

JOHN GUNNING,
Managing Director and Secretary,
Automatic Light Controlling Company, Ltd.

100, *Holdenhurst Road,*
Bournemouth, April 29, 1926.

Distillation of Coal by Low Temperature.

SIR,—The writer's attent'on has been drawn to an interview with Dr. Lander, Chief of H.M. Fuel Research Board, by the "Morning Post" (April 19), at which interview Dr. Lander is reported to have remarked that any low-temperature process which may have reached a satisfactory experimental stage must be run for a period of three years to prove it to be a commercial success.

May the writer point out that a low-temperature plant originally owned by the Premier Tarless Fuel Syndicate, of which the writer was the technical Director and Mr. C. W. Tozer the Engincer, has been running for over ten years at Battersea, and for the first two years continuously on commercial lines. This process was described in the "GAS JOURNAL" in 1913. It is not a large plant, but sufficient to turn out 50 to 70 tons of high-grade smokeless fuel, about 1000 gallons of excellent marketable tar oils, some 700 lbs. of ammonia (calculated as sulphate), besides about 300,000 c.ft. of a very rich gas *circa* 700 B.Th.U. per c.ft., weekly for two years.

During these years the demand for the smokeless fuel was phenomenal, and we coul'd easily, had we had space to extend the works and more capital at our command to have done so, have sold hundreds of tons weekly, and the curious thing was that it was nearly all purchased by the more wealthy houscho'ders in Belgravia, who found it most desirable for their open grates.

We were paying about 20s. per ton for a slack coal which was little more than dust, and obtained without trouble 35s. per ton for the resultant fuel. The oils we sold to a we'l-known tar distiller, and what gas we had to spare after stripping it for spirits we sold to a neighbouring factory.

It was good business, but hampered by our want of sufficient capital and overhead charges in the shape of rather an expensive city office and an expensive Secretary. The Directors never took one penny in fees. This, I think, meets Dr. Lander's reference to the absence of any commercial plant connected with low-temperature carbonization.

With the advent of the war, we could obtain no more slack owing to Government restrictions, so we turned the plant into an experimental one, and put through some 1500 to 2000 tons of material representing coal, shale, cannel, lignite, brown coal, peat, and sewage sludge—over 200 samples altogether, from practically all parts of the world. The retorts dealt easily with whatever type of carbonaceous matter my co'league Mr. C. W. Tozer and myself were asked to test.

Many of the tests were carried out by experts of high standing—Dr. Mollwo Perkin, Dr. Dunstan (then of the East Ham Technical College and now chief expert to the Anglo Persian Oil Company), Prof. W. A. Bone, Prof. O'Shea, of Leeds University, and others. Their reports and findings are of inestimable value, and the writer will gladly show them to any one interested in the art. We were able to tabulate results of low-temperature carbonization never hitherto tabulated.

We received many curious samples to test, one being practically rock; the senders evidently thinking that we could go one better than Moses, and by manipulating their rocks obtain oil.

Regarding the life of the retorts, though they were sometimes cruelly used by the experts, yet after ten years of service they are practically as workable to-day as when first erected, and the upkeep has been insignificant—only a short time ago tests were made on Japanese coal supervised by Japanese Naval Officers, and the results were so satisfactory that the Japanese took over the process. Furthermore, a large commercial plant has been erected in Natal, and my old colleague Mr. Tozer has been in South Africa eighteen months or so working it successfully.

During the period these nice litt'e works were devoted to experimental work, the writer offered to lend them, without any cost to the borrower, to the late Sir Geo. Beilby, Chief of the Fuel Research Board.

The offer was declined. Matters are different now with Dr. Lander at the head of affairs; and the article by his two esteemed colleagues Mr. F. S. Sinnatt and Mr. I. G. King on a "Study of the Tars and Oils obtained from Coal" should be read by everyone interested in low-temperature carbonization. It is the best thesis ever written on the subject by a long way (see Journal of the Society of Chemical Industry, August 14, 1925).

The plant the writer is about to erect in the United States is an improved type of the Battersea unit, and with the great advantage that it is continuous in working. Nothing which is not labour saving will do in the United States.

F. D. MARSHALL.

May 4, 1926.

Steel Gasholder Tanks.

SIR,—In the current issue of the "JOURNAL" (April 28, p. 225), a formula is given for strength of steel tanks, in which the factor "E," for efficiency of joints, appears to be wrongly placed above the line. Tanks designed by the formula as stated would result in plates about half the thickness they ought to be by the correct formula.

The fundamental formula is based on the theory of thin cylinders, that the bursting pressure of the contained liquid in tanks is resisted by direct tension in the plates. Referred to a band 1 in. wide, at the depth at which the thickness is to be calculated, this is stated as follows:

$$pd = 2tf.$$

Where: p = Pressure of the liquid (lbs. per sq. in.).
d = Diameter of tank (in.).
t = Thickness of plate (in.).
f = Stress allowed in the metal (lbs. per sq. in.).

and for thickness, $t = \frac{pd}{2f}$

or, substituting radius r in inches:

$$t = \frac{pr}{f}$$

If the tank is to contain water, p in lbs. per sq. in. $= \frac{62{\cdot}35}{144} \times h$, where h = head of water (feet) at the depth to be considered, and the formula becomes:

$$t = \frac{62{\cdot}35 \times h \times r}{144 \times f}$$

Using Mr. Clark's factors for plate strength—viz., 28 tons per sq. in.—with a factor of safety of 4, and joint efficiency of 75 p.ct., we have:

$$t = \frac{62{\cdot}35 \times h \times r \times 4}{144 \times 28 \times 0{\cdot}75 \times 2240}$$

and, cancelling out, we get:

$$t = \frac{h \times r}{27{,}150}$$

Finally, as the diameter in feet is generally given, and not the radius in inches, we may say:

$$t = \frac{h \times \phi \times 12}{27{,}150 \times 2} = \frac{h \times \phi}{4525}$$

where ϕ = Diameter of tank (ft.).
h = Head of water (ft.), at depth where thickness is to be considered.

This gives a formula easy to memorize. But if other factors for strength are assumed, the constant will have to be altered accordingly. For instance, where butt-joints are used, it is possible to design joints with an efficiency of 80 or 90 p.ct. If oil is to be stored, the weight per c.ft. will be less than water, varying with the sp. gr. of the oil.

However, from the particulars given, it will be quite easy for anyone to make these adjustments to suit particular requirements.

A. O. JONES.

"Wyndcliffe," Vicarage Road,
Wollaston, Stourbridge,
May 1, 1926.

Removing Meters Owing to Floods.

The official magazine of the Columbia Gas and Electric Company describes the operations of the gas division of the Union Gas and Electric Company of Cincinnati during floods of the Ohio River, recalling the famous 1913 flood which affected 30,000 meters. Of this number, 11,000 were removed before the water reached such height that it was impossible to remove the others. Flood time on the Ohio means for the gas department long hours, cold days, and sleepless nights. A flood usually occurs during some of the coldest and most disagreeable weather of the year; and no other emergency puts as great a strain upon the department, because they must not only keep ahead of the rising water in preparing for the deluge, but be directly behind it as it falls, to get service into the flood district again in the quickest possible time. When the river approaches the 50-ft. stage, preparations for the removal of meters are begun; and when the 52-ft. stage has been reached, meters are taken out and the gas turned off in the south-eastern section of Cincinnati. As the water rises, various other sections of the city are affected, necessitating similar operations. Following floods, the draining of water, and the removal of sand and other accumulations from mains must be carried out before gas service is restored. Detection of possible leaks in pipes which have been frozen or dislocated during the rise and fall of the water, call into service every available man and truck to restore service.

A further issue by the Solihull Gas Company of 1000 shares of £10 each was sold by auction at the Grand Hotel, Birmingham, on Thursday last, in lots of ten shares. All lots were sold, the total realized being £11,005.

MISCELLANEOUS NEWS.

L.C.C. AND GAS AND ELECTRIC METERS.

At last week's meeting of the London County Council, Mr. W. J. Morton (Vice-Chairman of the Public Control Committee), replying to questions by Mr. J. D. Gilbert, said he had no knowledge of a statement in the Press that on a recent test a gas meter over-registered 16·28 p.ct.; but he was aware that at times some meters were found to over-register, and others to under-register. The Council's inspectors had no power to make surprise tests of meters in the areas of the different companies. All meters were required to be tested and stamped before being brought into use, and were tested at the request of either seller or consumer of gas. Any consumer could have his meter tested, if he so desired. The Council already exercised their full powers in regard to the testing of meters under the Sale of Gas Acts and the Gas Regulation Act, 1920.

Mr. Gilbert asked similar questions of the Chairman of the Highways Committee with regard to the alleged over-registering by an electric light meter 4·5 p.ct., and by an electric power meter 5½ p.ct.

Mr. C. W. Matthews said that a test made at the request of a consumer in February last revealed the result stated in regard to the power meter; but no test had been made on the electric light meter.

The above references are to a letter which appeared in "The Times" on Saturday, April 24:

ELECTRICITY AND GAS METERS.

SIR,—I have just had an interesting experience here which is worth making public. Believing, for sufficient reasons, that I had not consumed the amount of electric light, electric power, and gas with which I had been charged, I caused the three meters to be tested, with the following results:

Electric light over-registering	4·5 p.ct.
Electric power over-registering	5½ p.ct.
Gas over-registering	10·28 p.ct.

One wonders how many consumers are being similarly overcharged in London. My case may be exceptional; but I should not be surprised, if most people took the trouble to have their meters tested, to find that the gas and electric light companies are making a great deal of money out of unconsumed light and power. Inspectors are employed to test the accuracy of scales and weights in shops. Heaven forbid that I should suggest that the overburdened taxpayer should bear further charges for municipal or Government inspection of gas and electricity meters! But local authorities might surely compel the companies to test their meters at their own expense and at regular intervals, seeing that the consumer is already charged quarterly rent for instruments which, apparently, may be over-registering for a long time. My case shows that the unsuspecting consumer may be grossly overcharged.

RICHARD C. DAVIS.

8, *Ladbroke Terrace,*
Notting Hill Gate, W. 11.

The following further letters—the first by Mr. W. L. Galbraith (the Secretary of the Gas Light and Coke Company) appeared in "The Times" on Friday, April 30:

SIR,—With reference to the two letters from Mr. Richard Davis which you have published in your columns on the subject of electricity and gas meters, I would like it to be known that the Gas Light and Coke Company will gladly supply full particulars with regard to the procedure for the testing of gas meters to any consumer in its area of supply who will be good enough to communicate with me.

The experience of Mr. Richard Davis is, as he surmises it may be, certainly exceptional. We have over a million gas meters in our district; and, speaking with an experience of many years, we can say that it is a very rare occurrence for one to be found registering "fast" by any substantial percentage. It is more common to find them registering substantially "slow" by anything, indeed, up to 100 p.ct.—a fact due to the construction of the apparatus. The result is that the aggregate of the readings of the meters on the district is actually less than the total quantity of gas the Company sends out from its works; and careful investigation has proved that practically the whole of the difference is due to the fact that, on the average, meters register against the supplier. It may be mentioned that the Sale of Gas Act definitely "weights the scales" against the gas company, as it provides that any meter found 2 p.ct. fast shall be rejected, but that any meter up to 3 p.ct. slow shall be passed as correct. Of course, average results do not greatly interest the consumer who has the exceptional bad luck to have a 16 p.ct. fast meter in his house; but they do bear out the fact, of which we have ample proof, that his experience is indeed very exceptional.

It should be remembered that the Company would benefit only very slightly from such "gross overcharging" as Mr. Davis suspects. Under the sliding-scale clauses of the Acts of Parliament governing its procedure, the Company, before it can distribute increased dividends out of profits, must give its consumers a reduction in price equal in amount to over six times the increase in dividend, so that, of every additional £7 profit the Company earns, £6 goes to the public in reduced price.

Similarly, the cost of a compulsory periodical testing of all meters by the Company would fall as to six-sevenths on the users of gas. This would, in our own judgment, based on experience, be a gross waste of money. The present practice—whereby only those meters are tested when either party, the buyer or the seller, thinks there is reason to doubt, the cost being paid by the party whose doubt is proved to be unfounded—works very satisfactorily on the whole, and costs only a small fraction of what a wholesale testing would cost. But over and above all such considerations, I should like to state, and state strongly, that the Company much prefers, as every firm that understands the first elements of business prefers, that its customers should pay only for what they receive, and should feel always that they have had full value for their money. Gas meters are, in fact, wonderfully accurate on the whole; but no one would rejoice more heartily than the gas companies themselves if they could be made quite infallible.

W. L. GALBRAITH, Secretary.

Gas Light and Coke Company,
Horseferry Road, Westminster, S.W. 1,
April 28.

SIR,—Referring to recent correspondence on the subject of electricity meters, it may interest you to know that, so far as consumers in the City of London are concerned, the independent authority for testing "disputed" electricity meters is the Corporation of London, Guildhall, E.C. 2.

As for Mr. Davis's remarks regarding the testing of meters by the supply companies before use on a consumer's premises, I think he would find on inquiry that the majority of supply companies and borough councils in London test their meters before sending them out on service; and the probability is that the meter he disputed had been so tested. The real safeguard to the consumer is to have these meters tested and sealed by an independent authority before putting into use.

As a further matter of interest, I may add that, of the number that pass through my test room, about 60 p.ct. of "disputed" meters are found to be correct, 15 p.ct. to be under-registering, and 25 p.ct. to be over-registering.

A. ROBERTS,
Electric Inspector under the C.L.E.L. Orders, 1890, 1891, and 1899.
Public Health Department,
Electrical Engineer's Office, Guildhall, E.C. 2,
April 29.

GAS SUPPLY IN LANARKSHIRE.

Middle Ward Development

The Middle Ward of Lanarkshire District Committee have for some time been considering various means of developing the gas supply of the district through the various works they have acquired, and have the benefit of the skilled advice and guidance of Mr. W. Doig Gibb.

A meeting of a Sub-Committee appointed by the District Committee to consider the further development of the scheme was recently held; and they reported to the Parent Committee. It appeared that on March 31 it had been agreed that it was essential that the fullest use should be made of all existing manufacturing plant at the Blantyre, Cambuslang, and Uddingston stations before contemplating the provision of additional works at any of the manufacturing centres; and the Clerk (Mr. W. E. Whyte) submitted a memorandum which he had prepared containing information as to the capacity, &c., of the manufacturing plant available. The Sub-Committee, after carefully considering the information in the memorandum, and having heard the Uddingston and Cambuslang Gas Engineers, were of the opinion that it would be possible to meet the requirements of the various gas supply districts during next year from the manufacturing plant at present in use at Uddingston and Cambuslang (that is, the vertical retort plant), having a reserve for use, if that should be necessary in case of breakdown or emergency (*a*) the horizontal bench of retorts at Cambuslang, and (*b*) the horizontal retort, &c., plant at Blantyre. It was resolved to recommend to the parent Gas Committee: (1) That the arrangement above mentioned be agreed upon; (2) that the horizontal bench of retorts at Cambuslang be put into condition to permit of their use if required; (3) that the Blantyre plant be not dismantled, but retained for use if need be, during the next year, at all events; (4) that if the horizontal retorts at Cambuslang and the plant at Blantyre should be brought into use during the period of the arrangement, thereby increasing the cost of the manufacture of the gas, such extra cost, as also the cost of bringing the horizontal retorts at Cambuslang into suitable working condition, be equitably distributed among the various gas supply districts; (5) that the Clerk, in consultation with the Uddingston and Cambuslang Gas Engineers, should prepare and submit in due course proposals as regards meeting the requirements of the various districts after the expiry of next year, with estimates of cost and all other necessary data to enable the Committee to come to a decision.

The Sub-Committee were of opinion that if the foregoing recommendations were adopted, next year's gas requirements would be safely met from existing resources; and the Committee would be able at greater leisure, and with greater confidence arising from the experience that would be gained, to determine upon the most expedient and advantageous scheme of development of the Middle Ward gas undertaking of a permanent character.

The District Committee unanimously adopted the recommendations.

At an inquest at York, on April 27, on John Williamson, rubber manufacturer, who was found dead in his shop, a verdict of "Accidental death" was returned; there being no evidence to suggest cause for suicide. The police officer who found deceased said the gas ring in the shop had the gas turned on and a kettle, partly filled, on it. A brother of deceased spoke to Williamson outside the shop, when deceased went inside to make himself a cup of tea on the gas ring, while waiting for a train to Leeds. The police suggested that it was quite likely the fatality was due to the water boiling-over and extinguishing the flame.

BOMBAY GAS COMPANY, LTD.

Ordinary General Meeting.

The Ordinary General Meeting of the Company was held at the London Offices, Moorgate Station Chambers, E.C., on Wednesday, April 28—Mr. WILLIAM GRAHAM BRADSHAW, C.B.E. (the Chairman), presiding.

The SECRETARY (Mr. A. Dickson, jun.) read the notice convening the meeting; and the Directors' report and the statement of accounts for the year ended Dec. 31 were taken as read.

CHANGES IN THE DIRECTORATE.

The CHAIRMAN: Ladies and gentlemen, before calling your attention to the salient points in the accounts before us (which I think you will regard as very satisfactory), I must make some brief comments on the changes which have taken place in the Directorate. Our old friend and colleague Mr. Louis Penny, owing to increasing years, has carried out the intention which he announced at our last meeting, and, to the great regret of his fellow Directors, has resigned his seat on the Board, after a connection with the Company extending over a period of nearly 43 years. In this time he served for 17 years as Engineer and General Manager in Bombay. Subsequently he became an Auditor, and was then appointed a Director, which office he held for 24 years. I cannot speak too highly of the excellent work which he did for the Company in each of these capacities, and I am sure you will associate yourselves with the Directors in their expression of appreciation of his long and able service which appears in the report. I regret, also, to have to state that Mr. Charles Hunt, who has for so many years occupied a leading position in the gas industry, for the same reasons—namely, declining health and advancing years—has taken the opportunity of its being his turn to retire, and has intimated that he does not wish to seek re-election. Mr. Hunt's wide knowledge of the gas industry, and his great ability as a gas engineer and administrator, have been a great advantage to the Company during the 21 years he has been a Director; and we thank him heartily for his valued services. We wish both these gentlemen many years of health and happiness in their retirement. The report intimates that, in accordance with the Articles of Association, we have elected Mr. A. M. Paddon, M.Inst.C.E., to the seat vacated by Mr. Penny. Mr. Paddon is so well known as one of the most eminent gas engineers and administrators in the country that I need not say anything on that score; but for the benefit of those shareholders who are not intimately acquainted with the gas industry, I may state that, after a distinguished career first as an engineer and then as a barrister-at-law, he is now a Director of the South Metropolitan and Commercial Gas Companies and Chairman of several other very important gas companies, and that he has almost unequalled qualifications for the position of a Director of this Company. In addition to this, Mr. Paddon has a knowledge of India, acquired during his residence there in early life as an engineer, which will be of great value in the management of this concern. The shareholders in the Company are much to be congratulated that Mr. Paddon was able and willing to accept a seat on the Board. ["Hear, hear."] Mr. Hunt's retirement only takes place as from to-day, and the Directors have not, of course, dealt with the vacancy arising from it.

BUSINESS CONDITIONS IN INDIA.

Now, turning to the report and accounts, you will probably have seen the very satisfactory account of the progress and prosperity of India contained in Sir Basil Blackett's recent budget statement in Delhi. Sir Basil Blackett is the Finance Member of the Viceroy's Council. For that condition of affairs, bringing as it does a measure of contentment and peace to all classes, we may be profoundly thankful. A satisfactory improvement, moreover, is to be noted in the general foreign trade of India, as indicated by the excess of exports over imports. The value of exports in 1924 exceeded that of the imports by 96 million pounds, and in 1925 by 121 millions; being an increase of 25 million pounds over the previous year. The value of exports in 1925 was 16 million pounds more than in 1924. The figures for Bombay Province alone show a slight but satisfactory improvement. Exports in 1925 were 2 million pounds more than in 1924, and imports were 7 million pounds less, resulting in an increased balance of trade of 9 million pounds in favour of Bombay. Our General Manager in India (Mr. Lane), however, writes that the year 1925, from a trading point of view, was a most unfortunate one for Bombay, and far worse than the preceding year. The textile mills in particular, in spite of the suspension and subsequent removal of the excise duty on cotton goods, suffered badly from the exceedingly keen competition of Japan, where the system of long working hours still prevails; and many of the mills were working at a heavy loss, and some were forced to shut-down. Mr. Lane also states that engineering establishments had a bad year, and shipping likewise. In consequence large numbers of petty merchants have been compelled to close-down their businesses, and have left the city. Owing to these conditions, the Government have been obliged to order the suspension or abandonment of most of the big schemes of the Bombay Development Directorate, with the result that thousands of the people have been thrown out of work.

ECONOMY AND RETRENCHMENT.

You will readily understand from this statement that the satisfactory results shown in the accounts were only attained by a policy of careful economy and retrenchment, by which working expenses were reduced. In the result, while gross receipts are less than in the previous year by £7316, this sum is more than counterbalanced by savings in expenditure on revenue account, which is £11,136 less than in the year 1924. Thus the profit is £3820 better than in the previous year. The carrying-out of this policy of retrenchment necessitated the closest supervision on the part of the management in India; and they are to be congratulated on the success of their efforts. Notwithstanding the adverse conditions that existed in Bombay throughout the whole year, it is a matter for satisfaction that we have practically maintained our position regarding the sales of gas; for there is only a slight decrease of 1·2 p.ct., following an increase of 3 p.ct. in 1924. We have, however, lost, as I have already mentioned, a number of small consumers, owing to the big mill strike during the second half of the year. These consumers lived on the money received and spent by the mill hands, and were forced to close-down their trading when the mill hands left Bombay in thousands for their homes up-country. An appreciable number of consumers have also been lost for the time being in consequence of some hundreds of houses being demolished in the process of road widening schemes; but we shall undoubtedly recover these when new properties are erected. In order to meet in some measure these adverse circumstances, a new and attractive showroom has recently been opened in the most central position in Bombay; and the Manager reports that he is more than satisfied with the increased business resulting from it. A further reduction in price of gas for heating purposes of 8 annas per 1000 c.ft. has been made, which it is confidently expected will stimulate the sales of gas and result in an increase of consumers.

THE ACCOUNTS.

Turning to the accounts, the total expenditure for the year charged to capital account is £462. The expenditure on new mains is £776; but capital account is credited with £314 owing to meters brought into stock from the district. The amount of capital expended in excess of capital raised is £51,016; and it is only by the use of the reserve and renewal funds in the business that an issue of fresh capital, which would cost the Company 7 or 8 p.ct. per annum, is avoided. In the revenue account, the receipts from gas are smaller by £2476, owing to the quantity of gas sold having been less than in 1924. The revenue from the sale of residual products was less by £4613, of which the diminished receipts from coke and breeze accounted for £4536; the average price having fallen from 46s. 3·9d. per ton to 42s. 0·2d. per ton—a reduction of 4s. 3·7d. per ton. This reduction was foreshadowed at the last general meeting, when I explained the two causes—namely, the downward tendency in the price of coal affecting the selling price of coke, and the necessity of a further reduction in price in competition with the importation into Bombay of coke from the Bengal coke oven companies. The sales of tar in the first half of the year were normal; but in the second half they fell off considerably, the road authorities having decided to construct their main roads for heavy traffic with concrete and a surface of Trinidad bitumen, in place of tar macadam. The average price of tar sold during the year was, however, 11d. per gallon compared with 9¼d. per gallon in 1924. In total the receipts are down by £7316. On the other side of the revenue account, the expenditure is less by £11,136. Coals cost £7227 less; the quantity of coal carbonized being 1161 tons less, and the price per ton carbonized 36s. 2¾d., against 39s. 11d. in 1924—a reduction of 3s. 8¼d. per ton. Of this reduction 2s. 10d. per ton (or £3812) represents the financial relief obtained under new contracts effected at lower rates concurrently with deliveries under an existing contract. The quantity of coal carbonized was 26,715 tons; and the sale of gas per ton of coal carbonized amounted to 13,575 c.ft., compared with 13,093 c.ft. in 1924—an improvement of 482 c.ft. per ton of coal. The net cost of coal, after deducting receipts from residuals, was 6d. per 1000 c.ft., compared with 7¼d. in 1924—a reduction of 1¼d. per 1000 c.ft. The item of rent, rates, and taxes is less by £2302, mainly resulting from a refund obtained in respect of Dominion income-tax for the two years 1924 and 1925. The expenditure in general charges, which is more by £1448, includes a sum of £1005 for stamp duty on registration of the increase in the nominal capital of the Company. In view of the unsatisfactory state of trade in Bombay, it is fortunate that our losses by bad debts amounted to no more than 0·02 p.ct. of the gross receipts.

THE NET RESULT.

In the net result of the year's work the balance of profit carried to the net revenue account is £25,581, compared with £21,761 in 1924—an improvement of £3820. There is a profit on exchange of £7418, compared with £5185 in 1924; the average rate of exchange of the rupee being 1s. 6·08d., against 1s. 5·47d. in 1924. Adding this and the sum of £180 for interest, there remains a net profit of £33,179 for the year. In conjunction with the undivided profit of £34,208 brought forward from the previous year, there is a total available profit of £67,388. Deducting from this the interim dividend of £12,000 paid in November last, and the usual additions to the reserve funds amounting to £2812, there remains £52,576, out of which a final dividend of 4 p.ct. is recommended, making 8 p.ct. for the year and leaving £40,576 to be carried to the current year, which is £6368 more than was brought in. In the balance-sheet the total assets have been increased by £17,675. The liability to sundry tradesmen and other accounts is more by £7063, and includes a special sum of £6000 charged in the accounts for the provision and erection under contract of retort charging machinery and coal and coke handling plant. In the past the cheap labour available made it economically not worth while to incur the cost of installing stoking machinery; but the increased wages which now have to be paid, and the difficulties caused by labour troubles due to the activities of political agitators, have made it advisable to have mechanical means of working the retorts. We estimate that the stoking machinery and coal and coke handling plant which are now in course of erection will effect a considerable reduction in the cost of carbonization. At the same time, I must state that the results already obtained by manual labour reflect the greatest credit on Mr. Lane (the Engineer), Mr. Sherret (the Works Superintendent), and those who work under them.

AS TO THE FUTURE.

As to the future it is difficult to speak. It is to be regretted that

there is little or no improvement in the trade of Bombay at the present time; and until the mills are again working full time, better trade conditions cannot be expected. The Manager, however, writes optimistically concerning the sales of gas for 1926. He states: "We have solid facts in front of us already as to the impetus that has taken place since we were able to announce the Board's decision to reduce the selling price of gas for heating purposes 8 annas per 1000 c.ft. This, combined with the new showroom in the most important thoroughfare of the island, is a policy from which the Directors need have no fear but that excellent and beneficial results will accrue. Our fittings department at the time of writing is more than full-up with orders, which is a healthy sign." On the other hand, we must anticipate a further reduction in the current year in the receipts from residuals, owing to the excessive and ruinous competition from the coke oven concerns up-country. The reduction in the price of gas for heating purposes may bring about some reduction in the revenue from gas sales; but the saving in the cost of manufacture from the new stoking plant, which will, we anticipate, be in operation for five or six months of the year, and a reduction in the charges for coal freights, will to some extent at any rate compensate for the diminished revenue to which I have referred. If, therefore, there is any improvement in the condition of affairs in Bombay, we may anticipate a favourable result; for our Manager there assures us that our works and plant are in excellent order, and that the staff working under his directions, European and native, are both zealous and efficient. It only remains for me to say that the report and accounts which I have the honour to lay before you do great credit to Mr. Lane for what he has been able to achieve in this the first year of his general management, and also speak of the sound foundation laid by his predecessor in office. It is my pleasure to move:

> "That the report of the Directors and the statement of accounts for the year ended Dec. 31, 1925, now submitted, be, and the same are hereby, received and adopted."

The Deputy-Chairman (Mr. H. H. Macleod) seconded the resolution.

Mr. W. J. Liberty asked why new capital would cost 7 or 8 p.ct.

The Chairman replied that new capital had lately been raised by them at 8 p.ct. Possibly for a preference issue they might get the rate down to 7 p.ct.

The motion for the adoption of the report and accounts was then put to the meeting and carried unanimously.

The Final Dividend.

Proposed by the Chairman, and seconded by the Deputy-Chairman, it was agreed:

> "That a final dividend for the year ended the 31st of December, 1925, of 4 p.ct. (less income-tax at the rate of 2s. 1½d. in the pound) be now declared payable on and after the 1st of May, 1926, making with the interim dividend of 4 p.ct. a dividend of 8 p.ct. for the year."

Re-Elections.

The Chairman next moved the re-election of the retiring Directors—Mr. Hugh Henderson Macleod and Mr. Arthur Matthews Paddon, M.Inst.C.E. He said that Mr. Macleod's services were of the utmost value to his colleagues and the Company, because he was intimately acquainted with conditions in India, and, better still, knew the coal market of that country from first to last. He had already spoken of Mr. Paddon, and would merely add his congratulations to the shareholders and to the Directors on the fact that that gentleman was now sitting at the Board.

Mr. Stanley H. Jones seconded the motion, which was unanimously carried.

On the motion of Mr. F. H. Hills, seconded by Mr. Bertram Ellis, the Auditors (Mr. Spencer Gore-Browne and Mr. Alfred Morland, F.C.A.) were re-appointed.

Votes of Thanks.

The Chairman said he was sure it would be the wish of no one that the meeting should conclude without a warm expression of thanks to those who had worked so hard in the interests of the Company. All were deserving of their gratitude, for they had rendered most excellent service. He could not speak too highly of the way in which the work was done in London. It was always done well, and willingly, and to the great advantage of the Company. With regard to India, it was common knowledge that those who worked there did so in circumstances that were trying to Europeans. Most favourable reports came to hand of the zeal and efficiency of all the European gentlemen who served them; and Mr. Lane spoke very highly indeed of the native staff. Throughout the year there had been no labour troubles whatever. The men had worked well and happily under the European staff. He moved:

> "That the best thanks of the meeting be given to the home staff and to the Indian staff, including the workmen, for their efficient services during the past year."

The Deputy-Chairman seconded the resolution, which was heartily carried.

The Secretary, acknowledging the vote, said the Bombay staff, of course, worked under far more trying conditions than did the London staff, and were deserving of the greater part of the shareholders' thanks. He would have pleasure in transmitting the vote to India by next mail, and was sure it would be highly appreciated. They had heard a good deal of the unfortunate state of affairs which had existed in Bombay during the last twelve months. The extent to which trade had been affected was shown by the statement of the Bombay Tramway Company that in the past year they carried no less than 9½ million fewer passengers than in the previous year. The Manager said that there was now showing a silver lining to the clouds; and it was to be hoped that this silver lining would spread, so that the Company might secure better results this year than in 1925.

Mr. Aschwanden proposed, Mr. Liberty seconded, and the meeting unanimously passed, a hearty vote of thanks to the Chairman and Directors for the excellent manner in which they had conducted the affairs of the Company during the past year.

The Chairman, in acknowledgment, said it was a great gratification to him and his colleagues to note how the Company slowly but surely improved its position from year to year. They had to face the competition of cheap electricity generated by water power; but in spite of this, through all the years of Mr. Burch's successful management, and through the past year, the Company had continued to go ahead.

MANCHESTER METER TESTING.

The Official Inspector of Gas Meters for the City of Manchester (Mr. Arthur Winterbottom) has submitted to the Lord Mayor and Magistrates of the city, the report of the City Justices' Gas Meter Testing Department for the year ended March 31.

The number of meters tested during the year amounted to 70,020, showing an increase of 9347 as compared with the previous year. The fees charged amounted to £3912; total receipts being £3993. Of the meters tested, 1960 were rejected, or 2·7 p.ct. Of the total wet meters tested—viz., 3544—196, or 5·5 p.ct., were rejected; and of 66,476 dry meters tested, 1764, or 2·6 p.ct., were rejected. The number of prepayment meters tested during the year was 42,176; the remaining 27,844 being meters of the ordinary type.

The following table will be of interest:

Cause of Error in Meters Rejected.

—	Leaks.	More than 2 P.Ct. Fast.	More than 3 P.Ct. Slow.	Passing Gas without Registering.	Will not Pass Gas.	Excessive Absorption of Pressure.	Other Faults.	Total.	P.Ct.
New wet meters	24	7	1	12	1	1	2	48	2·5
Old wet meters	39	55	2	30	4	2	16	148	8·8
New dry meters	48	158	137	119	28	18	24	532	1·02
Old dry meters	167	383	253	249	33	49	98	1232	5·1
	278	603	393	410	66	70	140	1960	

ELECTRICAL DEVELOPMENT AT ALDERSHOT.

An Extraordinary Meeting of the Aldershot Gas, Water, and District Lighting Company was held at the Company's offices, Farnborough, on Thursday, April 22, for the purpose of approving the proposal of the Company to extend the area in which they are authorized to supply electrical energy.

Mr. R. W. Edwards presided, and explained that a few months ago it would have been unnecessary to call a meeting of shareholders for the purpose in view; but there had recently passed into law a measure known as the Statutory Gas Companies (Electricity Supply Powers) Act, under which the Electricity Commissioners had formulated fresh rules and regulations. One of these rules demanded the sanction of the shareholders in general meeting to such an Order as the Company were about to promote. The scope of the Order was very straightforward. It consisted merely in making the Company's statutory areas for the supply of gas and electricity co-terminous, except the Borough of Aldershot. At one time a statutory company had powers to supply electricity to Camberley, and a private company in Fleet; but these and other districts were included in the Aldershot Company's Act of 1909, when Parliament granted powers for the supply of electricity over these contiguous areas. It was now intended to go further afield into the outlying districts, such as Hartley Wintney and Odiham to the north-west, and Elstead, Puttenham, and sundry other minor parishes to the south.

No question was raised; and on the motion for adoption of the Draft Order being put, it was carried unanimously.

Lancashire Tar Distillers, Ltd., is the title of a private company registered to carry on business as distillers, &c. The nominal capital is £100, in £1 shares.

Welwyn and Hatfield Debenture Issue.—In connection with the recent issue by Messrs. A. & W. Richards of £13,300 of 6 p.ct. redeemable debentures in the Welwyn and Hatfield Gas Company, Ltd., it may be mentioned that the total applications received amounted to £21,350. The price of issue was par.

South Suburban Stock Issue.—Particulars have been issued by the South Suburban Gas Company of £400,000 of 5 p.ct. ordinary stock, to rank *pari passu* with the existing ordinary stock of the Company. No tender will be considered at less than the minimum price of £98 per £100 of stock. The rapidly developing area supplied by the Company comprises 145 square miles. For the year 1925 there was an increase over the preceding year of 5·7 p.ct. in the sales of gas; while nearly 3600 new consumers were secured, and 10,500 additional gas cookers and fires were sold and let out on hire. The money now being raised is required to reduce the sum already loaned for capital extensions by the Company's bankers, and to meet the demand for fresh capital to carry on the steadily increasing business of the Company. The dividend on the ordinary stock for 1925 was 6½ p.ct.

NUNEATON GAS SUPPLY.

Council's Objection to Gas Company's Attempt to Lower Calorific Value.

The application which is being made by the Nuneaton Gas Company to the Board of Trade for permission to reduce the declared calorific value of their gas supply from 280 B.Th.U. per c.ft. to 200 B.Th.U. was criticized at a recent meeting of the Nuneaton Borough Council, when it was decided to forward the report to the Board of Trade and the Gas Referees.

Comparison shows that Nuneaton consumers are already using gas of a lower calorific value than any other town of similar size, and they are paying more per therm for it, as shown by the following table put forward by a Special Sub-Committee appointed to go into the matter:

Charges and Calorific Values Compared.

Place.	Price per 1000 C.Ft.	Price per Therm.	Dec. Cal. Value (B.Th.U.).
	s. d.	s. d.	
County Boroughs—			
Birmingham	3 0	0 7⅔	490
Leicester	3 4½	0 9	450
Coventry	3 2	0 7⅔	500
Derby (*a*)	3 1½	0 7½	500
Nottingham	3 3½	0 8¾	475
Burton-on-Trent	3 9½	0 9½	475
Chester (*a*)	3 3	0 8½	475
Worcester (*a*)	3 2	0 7½	500
Canterbury (*a*)	4 5	0 11½	460
Boroughs—			
Batley	5 1	1 2	440
Bromley (Kent)	4 7	0 11	500
Chatham (*a*)	4 0	0 10¼	475
Hove	3 11½	0 9½	500
Leamington Spa (*a*)	3 6	0 8¾	480
Maidstone (*a*)	3 11	0 9⅔	490
Nelson	3 1	0 8¼	426
Nuneaton (*a*)	*4 3*	*1 6¼*	*280*
Peterborough (*a*)	4 2	0 10	500
Shrewsbury (*a*)	4 1½	0 10¾	460
Warwick (*a*)	4 7½	1 0¾	470
Widnes	2 6	0 6½	475
Urban Districts—			
Barnes (*a*)	4 3	0 10¼	500
Cannock (*a*)	4 6	1 0	450
Hinckley	3 6	0 8¾	480
Mitcham (*a*)	3 8½	0 9⅔	470
Tipton	3 4½	0 9	450

(*a*) Private Company.

The matter was brought forward by the Highways and General Works Committee, who reported having considered a report and letter from the Gas Company. They recommended that the Council should not take any further action at present.

The Special Sub-Committee brought before the Highways Committee the following, among other, points: The Nuneaton Gas Company's price at present is 1s. 6¼d. per therm, which is considerably higher than that charged in any town of similar size. In no other town have they found gas supplied with so low a calorific value as 200 B.Th.U. per c.ft. On the contrary, most undertakings in the country are supplying gas at about 475 B.Th.U.

Section 1 sub-section 4*b* of the Gas Regulation Act requires the undertakers, in case of an alteration of declared calorific value, to take, at their own expense, such steps as may be necessary to alter, adjust, or replace the burners in consumers' appliances in such a manner as to secure that the gas can be burnt with safety and efficiency. The Council have not been informed or guaranteed that this work will be undertaken immediately by the Company. The Sub-Committee believe there are about 6000 consumers of gas in the borough; and this matter requires serious consideration. It is to be borne in mind that many consumers' fittings and appliances were installed and adapted for the gas supplied prior to 1914, and for a lower working pressure.

Appended is a statement made by the Nuneaton Gas Company, as contained in a letter addressed to the Borough Surveyor (Mr. R. C. Moon):

THE COMPANY'S VIEW.

"I beg to thank you for your letter of the 15th, and the Sub-Committee for sending me their report on the gas supply for the observations of the Directors thereon.

"The objects which the Directors hope to achieve by the change which they propose to make is to obtain the greatest possible number of B.Th.U. from each ton of coal; to enable them to use local coal instead of paying heavy carriage upon gas coal from a distance; and eventually to reduce the cost of gas to the consumer. The price to the consumer by means of a sliding-scale fixed by Act of Parliament regulates the amount of dividend payable to the shareholders. . . . The price per therm remaining the same, the price per 1000 c.ft. will, of course, be less in the proportion of 280 to 200.

"The Directors are satisfied that in the not very distant future the change they propose will be as much in the interests of the consumers as of the shareholders, and will result in a much greater efficiency in the production of B.Th.U. from each ton of coal than ever before.

"Yours truly,

"(Signed) GEORGE HELPS."

The Sub-Committee were of opinion that the present prescription of gas should not be altered in a downward direction if the interest of the consumers was to be safeguarded.

COUNCILLOR'S PROTEST.

Councillor G. TAYLOR expressed himself as not being satisfied with the position as regards the Gas Company, although he was Chairman of the Committee which had recommended that no action be taken. A great cry had been raised, "Does Nuneaton want cheaper gas?" but it was the quality of the gas the consumers were up against. A great shout had also been made about the local coal, but he did not think this had anything to do with it. He could not understand why a small town like Hinckley could sell their gas at 8¼d. per therm while Nuneaton had to charge 1s. 6¼d. For every cubic foot of gas sold in Nuneaton, Hinckley sold 4 c.ft.; the cause of this was that it was better value. They wanted gas just as much in Nuneaton as they did in Hinckley, but he for one objected to rubbish. Quite recently he had to have his gas stove replaced by a coal fire. He protested against lowering the calorific value to 200 B.Th.U. per c.ft.

Alderman C. A. READER said that as a member of the Sub-Committee he was rather surprised that the Highways Committee had decided to take no action, and he moved that the report referring to the gas be sent to the Board of Trade and the Gas Referees for their perusal and views on the matter. He did so because he contended that by lowering the calorific value of the gas they were lowering its ordinary value.

Alderman T. W. SANDS seconded the amendment.

Alderman MELLY observed that, from the table, Nuneaton appeared to have the worst record of the towns, and they certainly ought to support the amendment.

This was carried.

The following is a letter written in reply to the Borough Council:

SIR,—At the Borough Council's meeting stress was laid on the fact that the Nuneaton charges for gas are higher than other towns of like population. Do Nuneaton rates compare favourably on such a basis with other towns?

I should like to point out that the population has nothing whatever to do with the price. Given the same conditions of working and of district generally, together with a like class of consumer, the Nuneaton price would be considerably less than most other towns.

It may seem strange, but nevertheless it is a fact, that the average gas consumer in Nuneaton uses about one-third the quantity of gas that the average consumer uses in most towns. Broadly, it would be correct to say that if the consumption per consumer in Nuneaton were doubled, the price would be very nearly halved.

Nuneaton is on the top of a coalfield, and a good many householders are provided with free coal. This is a condition that does not help gas consumption for heating purposes.

Further, whatever may be said to the contrary, the quality of gas Nuneaton is supplying gives the consumer a better service than any other so-called richer quality would do supplied at like pressure; and thus Nuneaton gas does more work.

If any inhabitant of this district is really interested in the subject of cheap gas, I shall be most happy to demonstrate to him that the method of manufacture and application of gas adopted by the Directors of the Nuneaton Gas Company is the most progressive, scientific, and by far the cheapest in the country.

If such inhabitant requires gas in really substantial and regular quantities, we can sell it at a price much lower than anyone else.

GEORGE HELPS, Engineer.

Gas-Works, Nuneaton.

FATAL EXPLOSION AT BIRMINGHAM.

A verdict of "Accidental death" was returned in the case of Mary Evelyn Cooper (15), a toy painter, who was killed in an explosion of a gas stove at the works of Messrs. William E. Morris & Co., Ernest Street, Holloway Head, Birmingham, on March 29. Mr. R. G. Marsh, Fittings Engineer to the Birmingham Gas Department, gave a description of the drying stoves in which the explosion occurred. The stove was one of two, the doors of which opened into a small painting shop, 11 ft. by 19 ft. Evidence was given to the effect that, after the mid-day meal, a girl, finding several jets of the stove had been blown out by a draught, lighted them. The gas was on, and it smelt badly. The explosion then occurred. Recalled, Mr. Marsh said that when he went to the works to conduct the examination the girls told him that when there was a draught from the doors or windows the left-hand burner would go out. He found that the tap controlling the burner leaked, allowing a small quantity of gas to pass, which would burn at the injector. Experiments showed that the burner was liable to be extinguished or light-back, the possibilities of either being about equal. This could be expected from the position of the stove, and would be caused by draughts. Personally, he would have recommended that a stove so placed should be equipped with flat-flame burners, which would not be affected by draughts. He suggested an arrangement by which a burner could be fitted that would not light-back. Replying to the Factory Inspector, Mr. Marsh said the burners he described would be more costly than those in use. The Coroner said this happened to be the third explosion of drying stoves that had formed the subject of a Birmingham Coroner's inquiry during the past three months. The only moral one could draw was that extreme care must be exercised in connection with these stoves.

Patrick Michael Foley, a Huddersfield stoker, was sentenced to three years' penal servitude at the Huddersfield Quarter Sessions, on April 29, on charges of breaking and entering dwelling-houses and robbing gas meters.

From May 5 to May 15, inclusive, the Batley Corporation Gas Department are offering gas cookers (fixed free) on specially favourable terms, either direct or on hire purchase; and these cookers—described as a summer-time necessity—are the feature of a special show.

THE FUTURE OF THE COAL MINING INDUSTRY.

An Address by Sir Richard Redmayne.

Last Thursday's Annual Meeting of the British Science Guild, which was held in the Mansion House, under the Presidency of the Right Hon. Lord Askwith, K.C.B., K.C., was marked by several topical addresses—one of which was by Sir Richard A. S. Redmayne, K.C.B. (late Chief Inspector of Mines), who dealt with "The Future of the Coal Mining Industry," and another by Dr. E. F. Armstrong, F.R.S. (Managing Director of the British Dyestuffs Corporation, Ltd.), on "Dyestuffs." Sir Richard Gregory, D.Sc., in moving the adoption of the report, said there never was a time when scientific research workers were more required in industry. The colleges and technical institutions trained them; but there was not in some industries the eagerness to make use of such trained men as they would like to see.

Sir Richard Redmayne, in his opening remarks, said one might look back with longing regret to the middle of last century, to the days of small undertakings, when, in many instances, the colliery owner lived near his colliery, knew most of the workmen by name, and was able to take a keen personal interest in their welfare and in the welfare of their families. This condition has, however, been succeeded by that now existent, of public companies, larger mines, big outputs, numerous workers, and boards of directors resident far from the mines, and under which the interests of the miners are attended to by trade union officials, and collective bargaining is the order of the day. Transition is always at work; and it would now seem incumbent upon us to consider yet further steps in the evolution of the industry.

Report of the Royal Commission.

Though he would not use the words "the present system of ownership and working in the coal industry stands condemned," Sir Richard did say that, in view of the fact of coal mining being our national key industry, upon which nearly all other industries depend, and coal constituting, as it does, our chief exportable commodity, it is essential that no avenue should be left unexplored which may lead to a satisfactory scheme or schemes for putting this great industry on a sound commercial footing, and bringing peace and contentment to all engaged therein—capital, management, and manual labour. In this consideration, we are greatly aided by the recent searching inquiry by the last Royal Commission—an investigation which has resulted in a report which, he believes, will go down in history as one of the most exhaustive and remarkable productions of any Royal Commission or other Government inquiry, though he is not prepared to "swallow it whole." He expressed the opinion that the report is admirably lucid and full of wisdom, and drew special attention to the four following recommendations as to re-organization which affect the future:

The methods of utilizing coal are unscientific. Four-fifths of the coal consumed in the country is burnt in a raw state; oil and valuable bye-products are wasted, and the atmosphere is polluted.

The selling organization and methods of transport are too costly, and do not secure the best financial results for the collieries, and therefore for the miners employed in them.

The amalgamation of many of the present small units of production is both desirable and practicable.

Profit-sharing schemes, providing for the distribution of shares in the undertakings, should be generally adopted in the industry, and should be made obligatory by Statute.

Position in America and Germany.

In the United States, the "soft" or bituminous coal industry is, said the speaker, faced with problems not dissimilar to those with which we have to contend; and the recent United States Coal Commission (1922-23) made, in respect of these collieries, some not dissimilar suggestions. The United States annual output of soft coal is 500 million tons—nearly twice that of Great Britain—and there are over 14,000 soft coal mines, worked by over 12,000 corporations, partnerships, or individuals. In 1923 the miners worked on an average only 179 days. The mines are equipped and manned to produce twice as much coal as they do produce; and the output per man per day is four times that in British mines. The American Commission were impressed by the desirability of consolidation of properties by the "operators," and association of the "operators" for determining and carrying out labour policies, sale policies, and engineering policies—a combination which would result in securing substantial economies in administration, elimination of wasteful and injurious competition, the closing-down of high-cost collieries, and consolidating truck services in times of shortage in places where they could be used most advantageously. What they had in view was consolidation and integration, with the proper safeguarding of the public interest. In Germany the coal industry is in just about as bad a state as in Great Britain and the United States. The position is one of world depression. It is not that oil is taking the place of coal, or will take its place to any great extent. In stationary steam plants, even in America, its use will decline. The known supplies of oil in the United States, according to the figures put forward by the Federal Oil Conservation Board, will, at the present rate of consumption, not last more than 23 years; and although the known resources of the rest of the world are five or six times as great as those of the United States, they will, at the present rate of consumption, be used up in two or three generations. We are daily hearing of the superiority of the internal combustion engine; but there are some fields in which the use of steam is superior to the Diesel engine. The fact is we are beginning to realize that it is good practice to use steam at a pressure as high as even 700 lbs. per sq. in., and that with suitable turbines very remarkable results can be secured. It has been claimed that a wider use of electricity would improve the demand for coal; but only in so far as the provision of cheap power led to an expansion of industry would the extended use of electrical energy result in an increased consumption of coal. The immediate effect would be a decreased national consumption of high-class coal, but probably a greater consumption of lower-grade coal. Could the British public be induced to burn in their houses low-temperature coke in place of raw coal, undoubtedly it would result in an increased consumption of coal; but at most this would not amount to an increase of more than 15 million tons per annum, and to secure this increase the coke would have to be sold at a price not greater than that of raw coal, an assured market would have to exist for the oils produced, and a preferential policy would have to be evolved in respect of the motor spirit derivable from these processes.

Coal Too Dear.

The outstanding fact is, Sir Richard Redmayne went on to say, that coal is too dear to permit of its being used in such quantities as would absorb the possible production. All the large coal-using industries, with the possible exception of electricity, are depressed. There is a vicious circle in cost in regard to production in the broad sense. A break must be made somewhere—basic commodities must be cheapened. Coal is the fundamental commodity of the manufacturing industries. Wages may be temporarily lowered, hours of work may be temporarily increased, but not for long, and not to the extent necessary to bridge the gap between cost of production per ton and selling price per ton. The process of subvention is pernicious, and not to be considered for a moment. A subsidy does not even secure the end it was intended to meet. The buyer of coal demands his share of it in the shape of a lower price for coal; and so the gap widens. And when all is said, these are in the nature of temporary measures.

Combination of Collieries Advocated.

Sir Richard went on to express his firm conviction that the coal mining industry of this country can be placed on a profitable basis, and that in the not distant future; but to accomplish this, drastic re-organization will be required—the first move being in the direction of the combination of the collieries into groups of like natural conditions and of like conditions of trade. The Royal Commission have, he said, proved to the hilt, by their presentment of the working results of colliery undertakings of various sizes, the advantages of combination; and the kind and extent of combination which they had in view was indicated by them thus: "The amalgamation of many of the present small units of production is both desirable and practicable. This may often be effected from within; but in many cases it will only take place if outside assistance is given. Any general measure of compulsory amalgamation, on arbitrary lines, would be mischievous; the action to be taken should be elastic, and should enable each case to be treated individually." The report of the Commission does not indicate the number of the combinations desirable. Of necessity, this would be governed by local circumstances and conditions.

One Great Trust.

Coming then to the main point of his address, Sir Richard suggested that it is worth serious consideration whether a still further step should be taken, and the various group combinations be linked-up into one great trust; and he proceeded to consider the precedents that exist for such a proposal, and the accruing advantages. To mention only some of the benefits resulting from combination, distribution would be improved. The principle would be established and carried into effect that coal should be consumed as near the actual point of production as possible, with resultant saving in transport cost. Keen competition, also, between rival coal owners allows of the foreigner in normal times largely exploiting the coal output of the country. Central purchasing of materials for collieries makes for efficiency and economy. Combination would displace vested interests. Economy of administration would be achieved. The number of directors, managing directors, consulting engineers, and general managers would be greatly reduced. Combination would enable freights to be controlled to an extent impossible to the individual coal owner. As to the arrangements at the mines themselves, underground and surface haulage would be simplified, and central pumping could be concentrated at the most advantageous points. Money would be forthcoming to develop the poorer and backward collieries to the best advantage, and to allow of the extended introduction of labour-saving appliances.

Nearly all the advantages mentioned as accruing from group combination would, he thinks, be expanded and intensified under a condition of linking-up of the group combinations into a single trust. It has been urged that combination of units would tend to kill initiative. But this has not been the experience of the great Steel Trust of the United States, where friendly rivalry is in itself one of its substantial economies. It can be preserved and expanded in a coal combination, just as well as in a steel combination. Large as would be the capital requirements of a Coal Trust in this country, they would not be much more than half that of the United States Steel Corporation, the capital of which during the period 1919-23 averaged over £283,000,000 ($1,415,209,600). The Corporation was inaugurated in February, 1901, and employs about a quarter-of-a-million men; and the relations between the Corporation and the employees are excellent.

The workmen have no fear that they will lose their jobs by the

installation of labour-saving and output-increasing devices. Instead, they are assured that this is the only means by which their wages can be increased, and their standard of living improved. The Company encourages its employees to buy stock, and contributes an average of £1 a year for five years to the stock payments of employees who have been in the Company's service for that period of time. In this way, the workmen can buy common stock at £5 a share under market price. At the end of 1925 there were 47,647 employees holding 163,802 shares in the preferred stock, and 501,999 shares in the common stock of the Corporation. Blast furnaces with an output of 400 tons a day twenty years ago are now able to turn out 600 tons. The workmen, not including the general administrative and selling sections, received an average wage of £1 3s. 11¼d. per day during 1925, compared with 9s. 5d. in 1902. This happy result the Corporation attributes to the mutual goodwill and confidence that cement its interests with those of its employees, and to the strong assurance felt by the employees that the Corporation is out at least as much for promoting the well-being of the worker as it is for making profits.

It might be argued that the combination of steel companies in the United States constituted a much simpler proposition than that presented by the 1400 odd colliery ownerships in Great Britain; but this is not so. The undivided surplus which this Corporation has accumulated is $517,061,308 (say, £100,000,000). This is a most practical form of unemployment insurance enabling the Corporation in slack times to carry on extensive developments which require money when money is not coming in.

Without wishing in any way to dogmatize, Sir Richard said he could visualize some such corporation as he had described applied to coal in Great Britain—a combination of a series of corporations with local boards of capable men, with a central board composed of the best brains in the country, commercial, financial, legal, and engineering, with an Executive Committee meeting daily, and with an effective co-partnership system and representation on the boards by nominees of the workmen. The only assistance that would be required of the Government would be a loan at a nominal rate of interest, to tide-over the transition period, and allow of the at present unprofitable units being carried on until the combination was in being. The public would be protected against exorbitant prices by the application to the coal industry of regulations similar to those applicable to gas companies.

GAS REGULATION ACT APPLICATIONS.

There has appeared in the "London Gazette" the following notice regarding an application to the Board of Trade under the Act:—

SPECIAL ORDER.

Salford Corporation.

To authorize the borrowing of further money for the purposes of their undertaking.

POWER GAS FROM SLUDGE.

The Birmingham Tame and Rea Drainage Board, who are responsible for the disposal of the sewage of Birmingham and a number of adjacent towns, have decided to instal at the Saltley works, at a cost of £12,515, a sludge gas power plant. In 1921 an experimental plant was put down at the Cole Hall sewage works, for the generation of power from sludge gas; and the experience gained had induced the engineer to submit a larger scheme for the utilization of the methane gas produced from the sludge digestion tanks at the Saltley works.

The Board's present power requirements are approximately 1,000,000 units per annum—a figure which is likely to increase with the development of the bio-aeration process at Mimworth—and this is obtained partly from the Corporation of Birmingham and partly from the Board's generating station adjoining the Nechells refuse destructor. The agreement between the Board and the Corporation whereby steam is provided from the Nechells destructor will expire this year; and as its renewal by the Corporation is unlikely, the scheme now put forward provides for the installation of plant operating on methane gas to produce 500,000 units per annum to replace the supply hitherto taken from the destructor generating station. The engineer estimates that the saving in current will amount to £1125 per annum. The gas produced in the fermentation of the sewage sludge is composed of 67 p.ct. methane, 30 p.ct. carbon dioxide, and 3 p.ct. nitrogen. The calorific value is claimed to be higher than that of ordinary town gas.

Buxton Gas Exhibition.—Great interest has been aroused in an exhibition of gas cookery and various gas appliances organized by the Gas Committee of the Buxton Corporation. A feature of the exhibition (which closed on May 1) was a gas cooker with slot meter attached, which demonstrated how much cooking could be done by two pennyworth of gas. Mr. G. G. Shaw, the Gas Manager, said they hoped for good results in the shape of increased business. During the last twelve months there had been sold for cash or on hire-purchase 164 new cookers; and about 300 gas fires and radiators had been sold during the winter.

Blackburn Gas Undertaking.—In view of the visit by the Manchester and District Junior Gas Association to Blackburn, a few details regarding the local gas undertaking will be of interest. It is remarkable to note that, in spite of electrical competition, the output of the Blackburn Gas-Works has increased since 1920 from 810 million c.ft. to 1050 million c.ft. The figures are: 1921, 843 millions; 1922, 876 millions; 1923, 910 millions; 1924, 948 millions; 1925, 1004 millions; and 1926 1050 millions. When the gas undertaking was purchased from the Blackburn Gas Light Company in 1878, the annual output was 315 million c.ft.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

In view of the coal strike and the uncertainty as to what action the Government may take, if any, in regard to coal supplies, there is very little to report this week. Both public utility services and industrial concerns have, generally speaking, acquired sufficient stocks to last for a considerable time, and most Yorkshire and Lancashire collieries have also large stocks which accumulated during the recent slump. The question of present prices depends upon a variety of circumstances. As the time the strike was declared, the following were the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 23s. 6d. to 24s.; washed smalls, 14s. to 14s. 6d.; rough slack, 11s. to 12s.; smithy peas, 19s. 6d. to 21s. 7d.; coking smalls, 9s. 6d. to 10s. 3d. Derbyshire and Nottinghamshire—Top hards, 21s. 6d. to 22s. 6d.; washed smalls, 12s. 6d. to 13s.; rough slack, 11s. to 12s. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 18s. to 20s.; furnace coke, 16s. 6d. to 17s. 6d., all per ton.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

The market position showed little sign of tension up to the final failure of the peace negotiations last week. There was, of course, the eleventh-hour awakening of householders to the realities of the situation. The distributive facilities were strained, and overstrained in some cases, in the endeavour to meet in a very short time the demands of consumers who had procrastinated to the last on the chance of a rupture being averted. Speaking generally, there was no stringency in this district in the sense of supply not balancing demand. Whatever difficulty was experienced arose in the distributive channels, and in any case it was not serious. Big suppliers state there has been a certain hesitation among some of the merchants about putting more coal on the wharves than could be cleared last week. Cases are mentioned where London merchants curtailed their orders pending the negotiations, at the same time giving instructions for deliveries to be accelerated in the event of an accommodation being reached. The explanation was that some of the merchants did not relish the prospect of being subject to rigid control which might involve them in great difficulty when it came to distributing their holdings in accordance with very small allocations. It was mentioned without any attempt to attach a meaning to it that absenteeism had been very flagrant at some of the Midland pits in the week preceding the stoppage. Foundries and ironworks generally have made far less serious efforts for carrying on in the present deadlock than they made last July and on the occasion of previous trouble.

Then and Now.—The Pacific Coast Gas Association learned from Mr. Rudolph Jenny that there are now in operation in the United States approximately 1000 manufacturing gas companies, serving 10,000,000 customers in 4600 cities, towns, and villages, whose population aggregates in excess of 48,000,000 people. In the year 1850, there were in existence only 30 companies, according to the United States Census reports, whose combined receipts totalled less than $2,000,000. For 1925 the sales of gas approximated $450,000,000. In the last ten years both the output of manufactured gas and the revenue received therefrom have increased over 100 p.ct.

Expenses of Delegates at Conferences.—Having made application to the Ministry of Health for a ruling as to the payment by local authorities of the expenses of delegates attending the annual meeting in Newcastle-upon-Tyne in September next of the Institution of Public Lighting Engineers, Mr. W. J. Liberty (the Hon. Secretary) has been informed that the Minister of Health would be prepared to consider applications from local authorities whose accounts are subject to Government audit for sanction to the payment of the expenses of the attendance at the conference of not more than two delegates, one of whom should be the engineer or superintendent for public lighting in the district.

Birkenhead Gas for Wirral.—The Wirral Rural District Council have been informed that the Birkenhead Corporation have agreed to the Council's terms with regard to the Corporation's application to supply gas to various parishes in Wirral. Mr. S. Moore stated that one of Birkenhead's stipulations was that the charge to the added areas should be 25 p.ct. above that made in the borough, representing 9d. per 1000 c.ft. extra. The Council's representatives decided to persist in their opposition to the Corporation's application unless the latter consented to reduce the added charge to 6d. per 1000 c.ft., and to lay the mains to every parish in the Council's area within five years. After discussion the Corporation consented, and the Council's representatives withdrew their opposition. He thought they had made a good bargain for the district.

British Tar Products.—The Directors of British Tar Products, Ltd., which has lately been converted into a public limited company, have issued details of the works and operations of the Company covering the period from incorporation as a private company in 1920 to the close of the past year. The share capital is £400,000, of which £305,909 is issued and fully paid up. The Company was incorporated with the object of acquiring the business of British Tar Products, Ltd. (incorporated in 1916). They own a large tar distillation and benzole refining plant on the Manchester Ship Canal, as well as a creosote storage installation of approximately 15,000 tons capacity, with access to deep water berths for the shipment of products. Favourable long-term contracts have been entered into which will ensure the supply of crude tar and benzole for a considerable period of years.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *May* 3.

The market for tar products continues generally unchanged.

Pitch is steady at about 87s. 6d. per ton; but makers have little material available. For next season the value is nominal at about 80s. per ton.

Creosote is firm at 7½d. per gallon net and naked.

Tar spirits are steady and firm. Pure benzole and pure toluole are from 2s. 2d. to 2s. 3d. per gallon, and 95/160 solvent naphtha is 1s. 10½d. to 1s. 11d. per gallon.

Pyridine bases is unchanged at about 18s. per gallon.

Tar Products in the Provinces.

May 3.

Markets for tar products generally remain quiet, and it is almost certain the manufacturers will await the course of events before committing themselves to any extent.

In pitch, a fair-sized quantity was sold last week at 70s. f.o.b., while for one or two small parcels for prompt delivery 67s. 6d. f.o.b. was reported to have been accepted.

Creosote remains firm, and there is some talk of an advance in price for the second half of the year.

Water-white products are steady, and makers are willing to entertain contracts for forward delivery.

Carbolic acid and cresylic acid are quiet, with little or no demand.

Naphthalene and anthracene remain neglected.

The average values for gas-works products during the week were: Gas-works tar, 46s. to 51s. Pitch, East Coast, 67s. 6d. to 70s. f.o.b. West Coast—Manchester, 61s. to 63s. 6d.; Liverpool, 62s. 6d. to 65s.; Clyde, 67s. 6d. to 70s. 6d. Benzole, 90 p.ct. North, 1s. 8½d. to 1s. 9½d.; crude, 65 p.ct. at 120° C., 1s. 1d. to 1s. 2d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 8½d. to 1s. 9½d. Toluole, naked, North, 1s. 8d. to 1s. 9d. nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 5d. to 1s. 6d. Heavy naphtha, North, 11½d. to 1s. 0½d. Creosote, in bulk, North, liquid, 6½d. to 6½d.; salty, 5¾d. to 6d.; Scotland, 5¾d. to 5¾d. Heavy oils, in bulk, North, 6¾d. to 7d. Carbolic acid, 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, £4 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

CONTRACTS OPEN.

Mains, Services, and Fittings.

The London County Council are inviting tenders for the supply and fixing of gas mains, services, and fittings. [See advert. on p. 290.]

Purifiers.

The Gas Committee of the Borough of Port Talbot invite tenders for the supply of four dry lute cast-iron purifiers. [See advert. on p. 290.]

EXTENSIONS.

Chesterfield Gas Undertaking.

The Gas Committee of the Chesterfield Corporation have decided to erect a new gasholder at a cost of £35,850.

Extensions at Coventry.

The Town Clerk of Coventry reported to the City Council last week that the Ministry of Health had sanctioned a loan of £230,000 for extensions of plant at the Foleshill Gas-Works. For the time being the Ministry have not dealt with the new gasholder and siding.

Elevator and Conveyor for Skipton.

The Skipton Urban District Council have decided to have a new coal elevator and conveyor at the gas-works; and tenders are invited. The Council have determined, also, that after completion of this work an extra lift shall be added on the largest storage holder. There is already a tender for this.

TRADE NOTES.

Purifiers for Newbury.

Messrs. Ashmore, Benson, Pease, & Co., Ltd., of Stockton-on-Tees, have, subject to sanction for a loan being obtained from the Minister of Health, secured the order for two purifiers and superstructure for the Newbury Corporation. The purifiers are to be fitted with Parkfield specialities, including Pickering valves.

Woodall-Duckham Verticals for Wellington (Salop).

The Wellington (Salop) Gas Company, on the recommendation of their Engineer and Manager (Mr. H. J. Woodfine), have placed an order with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for an installation of continuous working vertical retorts, having a carbonizing capacity of 37 tons per day. The plant will be complete with coal and coke handling machinery, and coke storage hopper for loading into railway trucks; and provision will be made for the installation at a later date of a waste-heat boiler.

The Abertillery Gas Committee have decided to contribute £2500 to the relief of the rates for the period April 1 to Sept. 30, 1926.

The principal streets of Birmingham were first lighted by gas on April 29, one hundred years ago. The gas was supplied by contract; and the price was 15s. per 1000 c.ft.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 28.]

Nos. 10,179-10,886.

Adams, A. E.—"Dry gas meter." No. 10,792.
Heide, H. C.—"Graphic billing devices for standard gas meters." No. 10,847.
Karling, C. A.—See Heide, H. C. No. 10,847.
Mead, R. F.—"Gas stoves." No. 10,250.
Stewart, J.—"Gas meter." No. 10,575.
Tooby, C. F.—"Open grate for burning coke. No. 10,308.
Umpleby, F.—"Gas generators." No. 10,488.
Weis, J. A.—See Heide, H. C. No. 10,847.

Helps v. Oldham Corporation.—We understand that this case is not likely to come before the Courts again until early in June.

Colwyn Bay Results.—It was reported to a meeting of the Colwyn Bay Urban Council last week that the income of the gas undertaking during the year amounted to £46,801, and the expenditure to £44,172, leaving a net profit of £2629. Against this, £2808 was appropriated in respect of capital expenditure on meters. The surplus carried forward is £6189.

The Otley Gas Company are among the most recent contributors to the Leeds University Extension Appeal; the gift of the Company being £100. The appeal has so far realized £278,976.

A verdict of accidental death was recorded at an inquest at West Bromwich on April 28, on Alfred Green, who died as the result of an accident at the gas-works, where he was employed as a foreman. According to the evidence, on April 8 Green complained of pains in the head, which he said were due to an accident he had had during the night. He stated that while he was stepping across a coal hopper his foot slipped, and, in falling, he caught his head against a beam. He had been employed at the gas-works for 46 years. The general foreman said that the plank was 22 in. wide, and the place was well lighted. Dr. Penhale said death was due to concussion of the brain, followed by compression. Alderman Cox, Chairman of the Gas Committee, expressed sympathy with the relatives, and said it was the first fatal accident since the works were opened 46 years ago.

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GAS SERVICE
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STOCK MARKET REPORT.

In spite of the optimistic views generally expressed last week, no success attended the efforts of the Government to arrive at a settlement of the differences between the mine owners and the miners; and at the time of writing it seems more than probable that there will be a "national strike" in support of the miners' claims. On the Stock Exchange, business was kept going for the best part of the week by rumours of a postponement of the conflict, and in the belief that the Prime Minister would make an important statement thereon in the House of Commons. On Friday, however, with the non-fulfilment of what was only a pious hope, all pretence of further business ceased.

The uncertainty of the position had no great effect on prices. Gild-edged securities were slightly dull, and War Loan was purchasable at below par *ex* div. Considerable anxiety, however, existed as to the prospects for the current week.

In the Gas Market dealings were normal, and prices perhaps a little firmer. There was a fall of 1 point in the quotation of Continental Union stock. Primitiva shares were 3d. lower; and Newcastle consolidated dropped ¼ on the local exchange. On the other hand, as will be seen by the Table, a number of quotations were marked up; the principal improvement being a 4s. rise *ex* div. on Colombo ordinary, and 2½ points on the Montevideo stock.

An announcement of interest is the South Suburban offer of £400,000 5 p.ct. ordinary stock by tender at a minimum price of £98. It is particularly unfortunate that this issue should have to be made while the standard price is the subject of investigation. We feel sure that the Directors anticipated that the decision of the Board of Trade would have been made at an earlier date, the final hearing of the application having taken place on the 8th of March last. As the matter stands, possible investors can only base their tenders on an estimated reduction of the standard price. There is a comparison of the yields p.ct. on a 6 p.ct. dividend and a 6½ p.ct. dividend shown on the prospectus; and it may be interesting to possible investors to be reminded that the pre-war dividend and that for the year 1925 were at the same respective rates.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 70, Colombo 28s. 9d., 29s., Continental Union 33, Gas Light and Coke 80, 80⅛, 80¼, 80⅜, 80⅝, 3 p.ct. debenture 59½, Imperial Continental 140, Primitiva 11s. 3d., 11s. 7½d., 4 p.ct. (Buenos Ayres) debenture 68, 4 p.ct. (River Plate) debenture 66½, 67, 68, South Metropolitan 91½, 91⅛, South Suburban 5 p.ct. 98½, 5 p.ct. debenture 95½. Supplementary prices, Colonial 8 p.ct. preference 21s., Liverpool 5 p.ct. 79, Metropolitan (of Melbourne) 9½, £9 5s. 6d.

On Tuesday, Alliance and Dublin 70, 71½, British 104½, Gas Light and Coke 79⅛, 79⅝, 79⅞, 79⅞, 80⅛, 80⅜, 80⅝, 3½ p.ct. maximum 58½, 59½, 3 p.ct. debenture 59½, Imperial Continental 140⅜, 141, Primitiva 11s. 3d., 11s. 4½d., 11s. 6d., 11s. 7½d., 4 p.ct. (Buenos Ayres) debenture 67½, 4 p.ct. (River Plate) debenture 67½, South Metropolitan 91⅜, South Suburban 5 p.ct. debenture 94, 94½, Tottenham "B" 89, 89½, 4 p.ct. debenture 74.

On Wednesday, Gas Light and Coke 79⅝, 80, 80¼, 4 p.ct. preference 75⅝, 3 p.ct. debenture 58⅝, Hong Kong and China 20⅝, 20¾, Imperial Continental 139½, Primitiva 11s., 11s. 3d., 11s. 3½d., 11s. 4½d., 11s. 6d., South Metropolitan 91½, 3 p.ct. debenture 57⅛, South Suburban 99, 5 p.ct. debenture 94, 94½. Supplementary prices, Croydon 5 p.ct. debenture 92.

On Thursday, Bournemouth "B" 12⅝, 6 p.ct. preference 11⅜, Cape Town 4½ p.ct. debenture 71½, Commercial 4 p.ct. 78, European 5 5/16, Gas Light and Coke 79⅝, 79¾, 80, 80¼, 3½ p.ct. maximum 58¼, Imperial Continental 139, Oriental 101, 102, Ottoman 2s. 6d., Primitiva 11s., 11s. 3d., 11s. 6d., South Metropolitan 91⅛, 92, 6½ p.ct. debenture 102½. Supplementary prices, Danish 7.

On Friday, Commercial 4 p.ct. 78, Continental Union 32, Gas Light and Coke 79¼, 79½, 79¾, 80, 80¼, 4 p.ct. preference 75, 3 p.ct. debenture 58⅝, Imperial Continental 141, Primitiva 11s. 1½d., 11s. 4½d., 11s. 6d., South Metropolitan 91¼, 92, South Suburban 5 p.ct. debenture 94½, 95, 95½.

An acute shortage of credits was experienced in Lombard Street last week, but with the turn of the month conditions became a little more comfortable. It is expected that dividend payments will further relieve the position. Borrowers, however, had to pay 4½ p.ct. for fresh money, while the more usual charge for renewals was 4¼ p.ct. Treasury Bills were allotted at £4 5s. 7·62d. p.ct.—nearly 5d. p.ct. below the previous week's average.

On the Foreign Exchange Market, Belgian francs were weaker; the selling being attributed to Brussels sales. A new record was created at 144⅝, the price closing at 142⅜. The French exchange recovered slightly at the close, and finished at 147⅝. Sterling on New York showed wider fluctuations than usual, and finally moved against this country; the quotation being 4.86 11/32. Italian lire improved to 120.95.

Silver was firmer on Asiatic buying; but the price is still below the 2s. 6d. level, closing at 29 1/16d. per oz. Gold remained at the nominal price of 84s. 11½d.; there being no supplies in the open market.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Apl. 30.	Rise or Fall on Week.	Transactions Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 4	5	5	Aldershot 5 p.c. max. C.	74–77	..	..
322,992	,,	,,	4	4	Do. 4 p.c. Pref.	69–74	..	..
1,551,868	,,	Apl. 1	6½	6½	Alliance & Dublin Ord.	70–73	+2	70–71½
374,000	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	60–65	..	..
300,000	1	Oct. 22	1/7½	1/7½	Bombay, Ltd.	1 1/16–1 1/8	..	..
170,000	10	Mar. 4	8½	8½	Bournemouth 5 p.c.	12–13	..	..
435,050	10	,,	7	7	Do. B 7 p.c.	12–12½	..	12⅜
275,000	10	,,	6	6	Do. Pref. 6 p.c.	11–12	..	11⅜
50,000	Stk.	Jan. 7	3	3	Do. 3 p.c. Deb.	55–58	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	75–78	..	..
214,740	,,	Mar. 18	12	12	Brighton & Hove Orig.	167–172	..	..
244,200	,,	,,	9	9	Do. A Ord.	130–135	..	..
1,387,500	,,	Feb. 18	5	5	Bristol 5 p.c. max.	85–86*a*	..	..
855,000	,,	Mar. 18	8	7	British Ord.	100–105	..	104½
100,000	,,	Jan. 7	7	7	Do. 7 p.c. Pref.	117–122	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	69–74	..	..
100,000	10	Dec. 17	8	6	Cape Town, Ltd.	6½–7½	..	..
100,000	10	Apl. 22	4½	4½	Do. 4½ p.c. Pref.	5⅞–6⅛*	..	..
150,000	Stk.	Jan. 7	4½	4½	Do. 4½ p.c. Deb.	68–73	..	71½
626,860	,,	Feb. 18	6	6	Cardiff Con. Ord.	96–99	..	..
237,860	,,	Jan. 7	7½	7½	Do. 7½ p.c. Red. Deb.	98–101	..	..
157,150	,,	Mar. 4	5	6½	Chester 5 p.c. Ord.	87½–92½*b*	..	..
79,185	1	Apl. 22	†2/-	†2/-	Colombo Ltd. Ord.	28/–30/-*	+4/-	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/–22/-*	..	..
1,513,280	Stk.	Mar. 4	5½	5½	Commercial 4 p.c. Cap.	77–82	..	78
560,000	,,	,,	5/3/4	5/3/4	Do. 3½ p.c. Cap.	76–81	..	..
475,000	,,	Dec. 17	3	3	Do. 3 p.c. Deb.	55–58	..	..
800,000	,,	Oct. 8	—	4	Continental Union, Ltd.	32–37	–1	32–33
200,000	,,	Mar. 4	7	7	Do. 7 p.c. Pref.	85–88	..	..
737,150	,,	Mar. 4	6½	6½	Croydon sliding scale	95–98	..	..
403,100	,,	,,	5	5	Do. max. div.	79–82	..	..
492,270	,,	Mar. 4	6	9	Derby Con.	107–109*c*	..	..
55,000	,,	Dec. 17	4	4	Do. Deb.	74–76*c*	..	..
209,000	,,	Mar. 4	5	5	East Hull Ord. 5 p.c.	86–89	..	..
50,000	,,	Dec. 17	—	5	Eastbourne 5 p.c. Deb.	93–98	..	..
1,002,180	10	Apl. 1	†6	†4	European, Ltd.	5–6	..	5⅝
18,788,960	Stk.	Feb. 18	5½	4/17/4	Gas Light & Coke 4 p.c. Ord.	79½–81½	..	79½–80⅝
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	58–61	..	58⅛–59⅛
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	74–77	..	75–75⅝
5,602,620	,,	Dec. 17	3	3	Do. 3 p.c. Con. Deb.	57–60	..	58⅜–59⅛
181,315	,,	—	—	—	Do. 6 p.c. Br'tf'd Rd. Db.	102–104	..	..
130,000	,,	—	10	10	Do. 10 p.c. Bonds.	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 18	6½	6½	Hastings & St L. 5 p.c. Conv	88–93	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	68–73	..	..
70,000	10	Sept. 24	†10	†10	Hongkong & China, Ltd.	20–21	..	..
173,200	Stk.	Mar. 4	10	10	Hornsey Con. 3½ p.c.	66–68	..	20⅜–20½
1,976,000	,,	Nov. 19	50	10	Imperial Continental Cap.	137–142	..	..
226,170	,,	Feb. 4	3½	3½	Do. 3½ p.c. Red. Deb.	69–72	..	139–141
235,242	,,	Mar. 18	6½	6½	Lea Bridge 5 p.c. Ord.	95–100	..	..
2,127,340	,,	Feb. 18	5½	5½	Liverpool 5 p.c. Ord.	79–80*b*	..	..
600,000	,,	Mar. 18	7	7	Do. 7 p.c. Red. Pref.	101½–103½*b*	+½	..
165,736	,,	Feb. 18	9	8	Maidstone 5 p.c. Cap.	115–120	..	..
63,480	,,	Dec. 17	3	3	Do. 3 p.c. Deb.	54–59	..	..
75,000	5	Dec. 3	†7	†6	Malta & Mediterranean	4½–5	..	..
541,920	Stk.	Nov. 19	†4	†4	Montevideo, Ltd.	75–79	+2½	..
2,061,315	,,	Mar. 4	5	5	Newcastle & Gateshead Con.	71½–72*d*	–¼	..
360,929	,,	,,	4	4	Do. 4 p.c. Pref.	75–76*d*	..	..
529,705	,,	Dec. 17	3½	3½	Do. 3½ p.c. Deb.	71–73*d*	..	..
15,000	,,	Mar. 4	11¼	11¼	North Middlesex 10 p.c.	155–160	..	..
91,530	,,	,,	8 2/5	8 2/5	Do. 7 p.c.	112–117	..	..
300,000	Stk.	Dec. 3	7	9	Oriental, Ltd.	98–103	..	101–102
188,120	,,	Jan. 7	7¾	7¾	Plym'th & Ston'house 5 p.c.	110–115	..	..
60,000	50	Mar. 4	14	14	Portsea Island B	90–95	..	..
100,000	50	,,	13	13	Do. C	88–93	..	..
2,289,909	1	—	—	—	Primitiva Ord.	10/9–11/9	–/3	11/–11/7½
302,600	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	84–86	..	..
600,000	Stk.	Jan. 21	4	4	Do. 4 p.c. Red. Deb. 1911	66–68	..	..
193,744	,,	Dec. 17	4	4	Do. B. Aires 4 p.c. Rd. Db.	66–68	..	67½–68
264,496	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	66–68	..	66½–68
150,000	10	Mar. 18	6	6	San Paulo 6 p.c. Pref.	7⅛–8	..	..
125,000	50	Jan. 4	5	5	Do. 5 p.c. Red. Deb.	43–46	..	..
270,000	Stk.	Mar. 18	5½	6	Sheffield A	98–100*e**	+1	..
419,968	,,	,,	5½	6	Do. B	98–100*e**	+1	..
1,047,000	,,	,,	5½	6	Do. C	98–100*e**	+1	..
90,000	10	June 11	6	4	South African	5–7	..	..
5,609,895	Stk.	Mar. 4	5	7	South Met. Ord.	91–93	..	91½–92
1,895,445	,,	Jan. 7	3	3	Do. 3 p.c. Deb.	56–59	..	57½
734,000	,,	Mar. 4	6½	6½	Do. 6½ p.c. Red. Db.	102–104	..	102¼
91,500	,,	Mar. 4	8½	8½	South Shields Con.	117–119*d*	..	..
1,187,795	,,	Mar. 4	6½	6½	South Suburban Ord. 5 p.c.	97–100	+1	98½–99
366,837	,,	Dec. 17	5	5	Do. 5 p.c. Deb.	94–97	..	94–95½
647,740	,,	Mar. 18	5	5	South'mpton Ord. 5 p.c. max.	77–80	..	..
121,275	,,	Jan. 7	4	4	Do. 4 p.c. Deb.	69–74	..	..
250,000	,,	Mar. 4	7	7	Swansea 7 p.c. Red. Pref.	100–102	..	..
200,000	,,	Dec. 17	6½	6½	Do. 6½ p.c. Red. Deb.	100–102	..	..
120,000	,,	Feb. 18	7½	7½	Tottenham District A 5 p.c.	107–112	..	..
883,275	,,	,,	5½	5½	Do. B 3½ p.c.	87–90	..	89–89½
150,000	,,	,,	28/4	5½	Do. 5½ p.c. Pref.	101–103	..	..
181,255	,,	Dec. 17	4	4	Do. 4 p.c. Deb.	74–77	..	74
288,351	,,	Mar. 18	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, &	67–68*d*	..	..
197,294	,,	Mar. 4	6⅝	6⅝	Wycombe 5 p.c.	90–95	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref.	85–90	..	..
91,800	,,	,,	6⅝	6⅝	Do. 5 p.c. Maidenh'd	87–92	..	..
80,000	,,	Mar. 4	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	123–128	..	..
255,636	,,	,,	7	7	Do. B 3½ p.c.	103–108	..	..
419,450	,,	,,	5/19/0	5/19/0	Do. C and New	88–93	..	..
852,000	,,	,,	6⅝	6⅝	Wimbledon 5 p.c.	97–102	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	105–110	..	..
66,416	,,	Jan. 7	3	3	3 p.c. Deb.	55–58	..	..

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3 Lengths	5 ft.	long with Mouthpiece end.			
11	"	10 ft.	"	"	"
1	"	7 ft.	"	"	"
1	"	6 ft. 6 in.	"	"	"
		2 mid-pieces 5 ft. long (plain ends).			

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